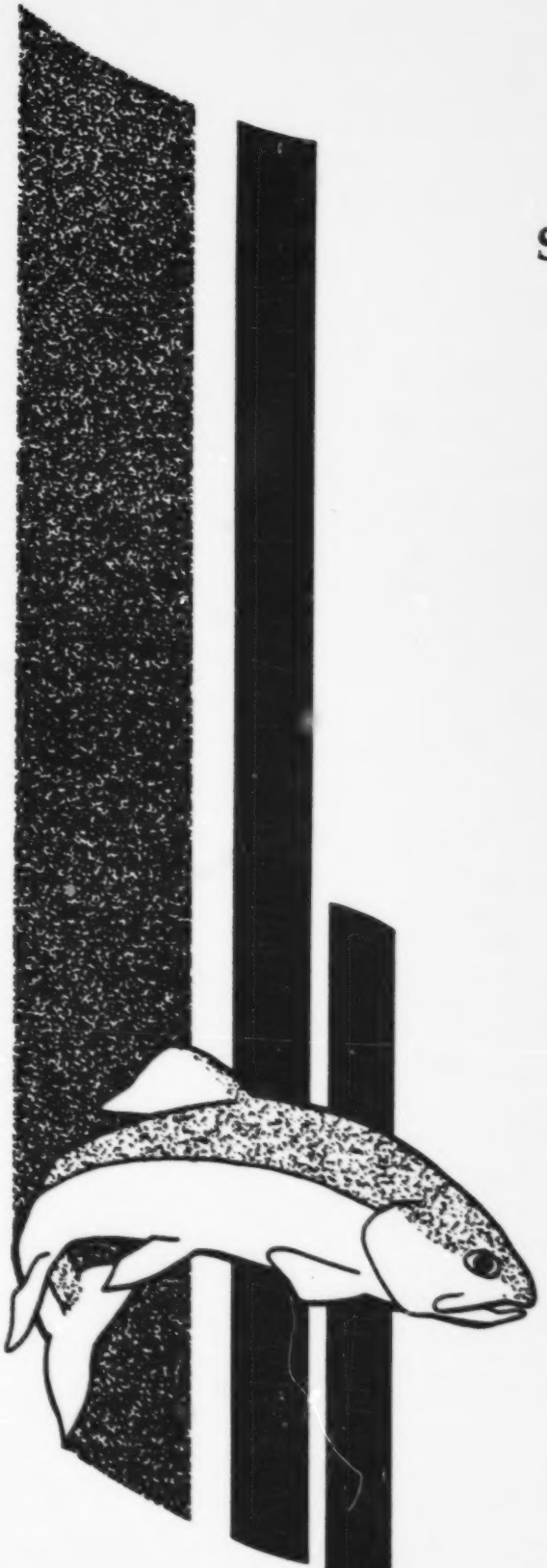

Steelhead Harvest Analysis

1986-87

by

SUSAN J. BILLINGS

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ABSTRACT

Billings, S.J. 1988. Steelhead Harvest Analysis, 1986-87. Fisheries Technical Circular No. 81, 44 p.

Since 1966-67, at the end of the angling licence year, a questionnaire has been sent to a sample of anglers who fished for steelhead in the British Columbia. Information was requested on their fishing activity and catch success for incorporation into the Steelhead Harvest Analysis. Over this time there have been considerable changes in licence sales, the number of days spent fishing, catch and release of steelhead, and regulations.

In the 1986-87 season, 32,721 steelhead angling licences were sold, 12% of which were to nonresidents of B.C. Questionnaires were sent to 54% of licencees and a response was received from 55% of those contacted. Of the respondents, 76% fished for steelhead at least once and, of the active anglers, 61% were successful in landing a fish.

The provincial steelhead catch has been increasing significantly since 1980. This year's catch of 188,417 fish was a record high. Recent increases in catch are a combined result of increased stock abundance and sizeable returns of hatchery fish to some rivers, as well as repeated captures of released fish. Provincial angling effort was also at an all time high of 279,505 angler days. Catch per angler day for the province was 0.71. The Chilliwack/Vedder River was, once again, the most heavily fished stream in the province with 67,315 angler days. Angling effort on this river nearly doubled over the previous year and generated more than half of all steelhead fishing activity in the Lower Mainland.

Reduced possession quotas as well as steelhead release regulations have resulted in a decreased proportion of the steelhead catch being kept. The ratio of fish kept has dropped from 63% in 1970-71 to 13% in each of the last three years. Of the active anglers, 36% kept between one and five fish and 4% kept more than five fish.

The Chilliwack/Vedder River reported the most fish caught (31,636) followed by Stamp/Somass/Sproat (15,973), Bulkley (10,897), Skeena (10,683) and Dean (7,845) rivers. Vancouver Island reported the highest number of steelhead caught closely followed by the Skeena Mainland and Lower Mainland areas. Hatchery fish comprised 27% of the total provincial catch. Almost half of the Vancouver Island and Lower Mainland catch was of hatchery origin. The release ratio for hatchery fish averaged 74% compared to 91% for wild fish.

Wild steelhead release regulations were in effect throughout the 1986-87 season on all Vancouver Island and Lower Mainland streams. Due to unexpected poor returns to the Fraser, Thompson, Chilcotin and Chilko rivers, an emergency steelhead release regulation was instituted on October 1, 1986, to help increase the spawning escapement. Steelhead release was also in effect on numerous Skeena area rivers.

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INTRODUCTION

Since 1966, all anglers fishing for steelhead in the province have been required to purchase a steelhead licence and punchcard in addition to their basic angling licence. This provided an opportunity for fisheries biologists to evaluate the steelhead trout sport fishery by conducting a mailout questionnaire survey of steelhead anglers. The result today is over twenty years of trend information on angling effort and catch success for steelhead streams in the province based on the survey results.

Originally, the Steelhead Questionnaire only asked if the angler fished for steelhead and, if so, how many days were fished and how many steelhead were kept from each stream. Five years later, in the 1970-71 fishing season, information was also requested on the number of steelhead released. The voluntary release of steelhead reported at that time comprised about 40% of the total catch.

The initiation of the Federal/Provincial Salmonid Enhancement Program (S.E.P.), in 1977, was an opportunity to expand the culture of steelhead in hatcheries. Many streams have since been stocked with hatchery reared fry and smolts as a method of enhancing steelhead populations. The first sizeable returns of hatchery steelhead began showing in the angler's catch in 1980 and the Steelhead Questionnaire was altered once again. Anglers were asked to report the number of wild and hatchery steelhead kept and released for each stream fished. This additional information has been useful in determining the success of the hatchery program as well as monitoring the abundance of wild stocks.

Wild searun trout, which include steelhead and anadromous cutthroat, are low in natural abundance and require careful management to prevent overharvest and ensure adequate spawning. Steelhead trout are harvested by a number of fisheries including a high-seas gillnet fishery, several different inshore commercial fisheries, native food fisheries, and the sport fishery. The number of steelhead caught incidentally in the commercial and native food fisheries is unknown. Efforts are being made, however, by monitoring the commercial landings to determine what runs are most affected and to estimate the number caught. The native Indian food fishery on the Skeena and Fraser rivers is also being monitored to estimate the steelhead harvest.

Those steelhead which escape the commercial fleet and Indian food fishery are available to the sport angler. This is presently the only user group whose "take home" catch can be easily regulated to ensure that enough steelhead survive to spawn. This is also the only user group for which reasonable steelhead catch estimates are currently available. Monitoring run strength for steelhead stocks is an important activity in fisheries management and is accomplished by catch analysis, snorkel and creel surveys, and juvenile fish abundance surveys. These data guide the regulation of the sport fishery and serve as the basis for negotiations with the federal Department of Fisheries and Oceans and native groups to increase the steelhead escapement.

Since 1977, the province's role in the Salmonid Enhancement Program (S.E.P.) has been to protect and enhance stocks of steelhead and anadromous cutthroat trout. S.E.P. funding has resulted in a greatly increased knowledge of these fish stocks. Surveys of stocks in the late 1970's revealed that many runs of steelhead were declining, particularly in southern British Columbia. Essential to the management and restoration of steelhead are habitat protection, harvest regulations, fish culture, and habitat improvement. Habitat related activities include the removal of barriers to fish migration; construction of spawning platforms to increase available spawning habitat; placement of boulders or log cover in streams to increase rearing habitat for juvenile fish; and stabilization of stream banks by establishing riparian vegetation, reinforcing with rip-rap, or fencing to eliminate damage caused by livestock.

Fish culture plays a major role in accelerating the recovery of severely depleted wild stocks and in sustaining major sport fisheries. Selected steelhead stocks are reared to fry or smolt size in provincial, federal, and public involvement hatcheries. Fry are released in underseeded areas of streams or above barriers (i.e. waterfalls), thus, maximizing the use of available rearing habitat. Smolts are reared at hatcheries or in floating net pens in lakes where they are fed artificially for one year until a size of about 18 centimetres is reached. Upon release to the river, the smolts migrate to sea returning to spawn in 2 or 3 years. Returning hatchery adults are recognized by a missing adipose fin. Steelhead releases, in 1987, consisted of 1.5 million fry and parr and 844,000 smolts to streams in the province (Appendix 1). Plans have been implemented to incubate and rear Skeena steelhead in northern S.E.P. hatchery facilities and reduce the need to culture these fish at the distant Fraser Valley Trout Hatchery. In 1986, the first hatchery steelhead adults returned to the Kitimat River. Skeena area steelhead are also being reared at Toboggan Creek, Kispiox and Deep Creek hatcheries. Thompson area steelhead are being raised, on contract, at Spius Creek Hatchery. The success of the steelhead stocking program is reflected in substantial hatchery adult returns to many rivers in the recent years.

Although there are planned exceptions, Recreational Fisheries Branch policy directs that hatchery reared steelhead be returned to their stream of parental origin and that, whenever possible, eggs are taken from wild fish rather than marked hatchery fish. Exceptions may be found in streams classified as "hatchery" (see below).

Concern about the impact of hatchery fish introductions on wild fish populations resulted in the development of a system of stream classification, based on expected genetic risk, to guide in the management of fish stocks. Three broad classes were developed: wild, hatchery and augumented.

"Wild" streams are managed to protect, maintain and enhance natural fish populations. Appropriate enhancement techniques include fry plants and short-term smolt plants using native brood stock, stream improvement to increase stream carrying capacity, and regulations to control the harvest.

"Hatchery" streams have severely depleted wild stocks and may also have damaged spawning and rearing habitat, but there is potential for angling through the annual introduction of smolts.

"Augmented" streams are managed to maintain healthy wild stocks while providing for a harvestable surplus through the addition of cultured fish. The risk of genetic mixing between wild and hatchery fish is minimized by using only native wild adults for brood stock. Smolts are released in the lower stream reaches where angling pressure is greatest. Returning hatchery adults are available for anglers to harvest while release regulations for wild fish ensure an upriver escapement. Stream improvement and fry stocking may also be used as a method of enhancement in augmented streams.

Sportfishing regulations are one of the most effective management strategies employed by fisheries biologists to protect and enhance steelhead stocks. Catch and release restrictions are used to protect wild stocks from harvest while still allowing anglers to enjoy the angling experience. Complete fishing closures are limited to specific areas where fish are in critical need of protection. Severe reductions in daily and annual steelhead catch limits, combined with favorable environmental conditions, have resulted in some river systems reaching or exceeding historical levels of abundance of steelhead in recent years.

Most of the anglers that fish for steelhead in the province are British Columbian's but many also come from other parts of Canada, the United States and around the world. Since the beginning of the questionnaire survey in 1966, the catch has ranged between 40,000 and 190,000 steelhead annually. This report details the results of the 1986-87 Steelhead Harvest Questionnaire, as well as presenting a comparative summary of previous years' data. The resident area boundaries used in this analysis correspond with the eight regional management boundaries. Reported catch and angling effort for the Skeena region, however, has been separated into Queen Charlotte Islands and Skeena Mainland to be consistent with previous years.

Included is a review of the 1987 juvenile stock monitoring program conducted by the Fisheries Assessment and Improvement Unit. Monitoring of juvenile steelhead abundance in various index streams throughout the province helps fisheries managers predict adult returns and determine required spawning escapements.

Also included are trends and forecasts of winter-run steelhead at the Keogh River, prepared by the fisheries Research and Development Section. Predictions are based on steelhead life history studies conducted since 1975.

METHOD

Information for the Steelhead Harvest Analysis was obtained from a postcard questionnaire survey of a sample of anglers who purchased steelhead licences in British Columbia. The questionnaire asked:

(a) Did you fish for steelhead between April 1, 1986, and March 31, 1987, and
(b) List the streams fished and, for each, the number of days fished, the number of wild steelhead kept and released, and the number of hatchery steelhead kept and released.

A total of ten resident groups were recognized: residents of eight regions of the province, residents of the other provinces and territories, and residents from outside of Canada (Fig. 1). Questionnaires were mailed to 49% of B.C. resident anglers and 89% of non-B.C. resident anglers for a combined sample size of 54% of all steelhead licencees. Nonresidents made up about 12% of licencees and were sampled at a higher rate to ensure a statistically adequate response. The returned questionnaries were analysed to determine wild and hatchery steelhead catch, angling effort and angler distribution for all streams fished.

RESULTS

During the 1986-87 fishing season, 32,721 steelhead angling licences were sold. Lower Mainland residents made up the largest segment (40%) of steelhead licencees. About 8% of the questionnaires mailed were either returned by the post office as undeliverable or were spoiled and unuseable. Disregarding the unuseable questionnaires, the response rate was 55%. The resulting sample group constituted 27% of all licenced steelheaders (Appendix 2).

Of the respondents, 76% actually fished for steelhead and, of these, 61% reported catching at least one fish. When extrapolated to include all anglers, an estimated 14,560 of 24,371 active anglers were successful in catching a steelhead (Appendix 3).

Steelhead anglers living in coastal drainage areas of B.C. where steelhead occur tended to fish in their home region. Of 8,926 angler units generated by Vancouver Island residents, 8,260 (93%) were spent fishing Vancouver Island streams. Similarly, Lower Mainland resident anglers spent most of their time fishing local streams (13,565 of 17,555 angler units). Angler units are one method of measuring angling activity and, in the Steelhead Harvest Analysis, were determined by counting all the anglers who fished each stream throughout the year. Of course, many anglers fish more than one stream generating an additional angler unit for each stream fished. Consequently, the total angler units are greater than the total number of anglers. Many Lower Mainland steelheaders also went to Vancouver Island to fish. On the Thompson River, 53% of the angler units were from Lower Mainland residents. The Dean River attracted a majority of anglers from other resident areas, particularly from outside of Canada. Just under half of the anglers fishing in the Skeena Mainland area were from outside of the region (Table 1).

Fig. 1. British Columbia resident areas.

The total number of days spent fishing on a river (angler days) is another method of measuring angling activity. The distribution of angler days in each region was similar to the activity measured in angler units with the Thompson, Cariboo and Skeena areas receiving a large proportion of fishing effort from visiting anglers (Table 2).

The total estimated provincial catch was 188,417 steelhead with Vancouver Island providing the largest catch closely followed by the Skeena Mainland and Lower Mainland areas. Almost half (46%) of the Vancouver Island and Lower Mainland catch was hatchery fish. Fishing effort was highest in the Lower Mainland region (120,682 days), followed by the Skeena Mainland (77,510 days). The provincial catch per angler day averaged 0.71. Anglers kept an average of 13% of the provincial steelhead catch, ranging from a low of 1% in the Thompson-Nicola area to a high of 15% in the Lower Mainland and Skeena Mainland areas. Hatchery fish comprised 27% of the total provincial catch. The release ratio for hatchery fish averaged 74% compared to 91% for wild fish (Table 3; Appendices 4 & 5).

The most heavily fished stream in the province was the Chilliwack/Vedder which supported 67,315 angler days and had the highest reported total catch (kept and released) of 31,636 fish. This total catch was followed by the Stamp/Somass/Sproat (15,973), Bulkley (10,897), Skeena (10,683) and Dean (7,845) rivers (Table 4).

Hatchery fish made up a sizeable component of the catch on numerous Vancouver Island and Lower Mainland streams (Appendix 5):

Vancouver Island:		**Lower Mainland:**	
Campbell/Quinsam	(48%)	Alouette	(61%)
Cowichan	(25%)	Capilano	(44%)
Englishman	(45%)	Chehalis	(72%)
Keogh	(58%)	Chilliwack/Vedder	(50%)
Little Qualicum	(51%)	Coquihalla	(21%)
Nanaimo	(39%)	Kanaka	(35%)
Oyster	(29%)	Little Campbell	(40%)
Puntledge	(39%)	Seymour	(31%)
Qualicum (Big)	(60%)	Silverhope	(25%)
Quatse	(80%)		
Stamp/Somass/Sproat	(73%)		

Of the active anglers, 8,739 (36%) kept from one to five fish, and 989 (4%) took home more than five fish. An estimated 23 anglers kept more than their legal limit of ten steelhead (Appendix 6). Approximately 46% of all active anglers spent between one and five days fishing. The majority of anglers living in areas with a large number of steelhead streams (Vancouver Island, Lower Mainland and Skeena) spent over five days angling for steelhead. This was also true of anglers from outside of Canada. Steelhead anglers living in areas where there are few or no steelhead streams generally fished for only one to five days (Appendix 7).

Table 1. 1986-87 Distribution of steelhead "angler units" in each region containing steelhead.

Resident Area	Angler units in Regions containing steelhead						Total Angler Units
	Van. Is	L. Main	Thompson	Cariboo	Skeena	QCI	
Vancouver Is.	8,260	182	106	52	217	52	8,926
L. Mainland	2,044	13,565	733	219	749	139	17,555
Thompson-Nicola	60	76	172	96	163	9	579
Kootenays	37	9	3	60	100	0	221
Cariboo	12	68	24	757	175	0	1,049
Skeena & QCI	48	48	8	40	6,542	1,003	7,755
Omineca-Peace	18	50	19	107	1,650	25	1,891
Okanagan	61	34	118	117	182	3	[illegible]
Nonres. Canadian	259	122	37	130	996	26	1,596
Non-Canadian	380	90	174	621	1,757	26	3,114
Total Angler Units	11,179	14,244	1,394	2,199	12,531	1,283	43,204

Table 2. 1986-87 Distribution of steelhead "angler days" in each region containing steelhead.

Resident Area	Angler days in Regions containing steelhead						Total Angler Days *
	Van. Is	L. Main	Thompson	Cariboo	Skeena	QCI	
Vancouver Is.	47,941	632	432	266	1,491	137	51,141
L. Mainland	5,771	118,876	3,339	1,194	3,516	366	133,510
Thompson-Nicola	189	304	845	530	1,101	40	3,009
Kootenays	79	67	22	338	583	0	1,108
Cariboo	25	357	62	3,781	958	0	5,217
Skeena & QCI	253	156	45	191	48,736	6,203	55,769
Omineca-Peace	58	278	84	394	6,288	51	7,262
Okanagan	154	103	499	689	637	6	2,104
Nonres. Canadian	865	674	168	565	5,173	86	7,617
Non-Canadian	898	678	1,034	3,550	9,961	62	16,643
Total Angler Days	56,233	122,125	6,530	11,498	78,444	6,951	283,380

* Totals differ from the area and provincial totals in Appendices 4 and 5 due to the level of precision of calculations (data on file).

Table 3. 1986-87 Angling effort and steelhead catch distribution.

Area	Angler days**	Wild ** Kept	Wild ** Released	Hatchery ** Kept	Hatchery ** Released	Total catch	Kept/ day *	Catch/ day *
Vancouver Island	55,695	168	29,602	5,254	19,598	54,622	0.098	0.980
Lower Mainland	120,682	490	27,518	7,763	16,177	51,948	0.068	0.428
Thompson-Nicola	6,480	32	4,080	5	129	4,246	0.005	0.667
Cariboo	11,347	1,438	11,217	34	80	12,769	0.122	1.192
Skeena - Mainland	77,510	8,134	44,957	136	753	53,980	0.105	0.727
- Q.C.I.	6,900	1,193	9,206	23	76	10,498	0.178	1.517
Unknown streams	891	99	211	8	36	354	0.142	0.472
Total	279,505	11,554	126,791	13,223	36,849	188,417	0.090	0.707

Table 4. Steelhead streams having the highest total catch in 1986-87.

Streams	Angler days**	Wild ** Kept	Wild ** Released	Hatchery ** Kept	Hatchery ** Released	Total catch	Kept/ day *	Catch/ day *
VANCOUVER ISLAND								
Stamp/Somass/Sproat	12,745	56	4,301	2,494	9,122	15,973	0.203	1.239
Gold/Heber	2,776	8	5,595	27	280	5,910	0.015	2.175
Campbell/Quinsam	7,285	2	2,901	381	2,332	5,616	0.052	0.755
Cowichan	6,345	8	2,859	260	717	3,844	0.042	0.606
Keogh	1,618	0	1,572	293	1,865	3,730	0.182	2.367
Little Qualicum	4,185	4	1,520	511	1,050	3,085	0.120	0.737
Qualicum (Big)	3,642	0	938	385	1,018	2,341	0.103	0.641
Nanaimo	4,139	29	1,334	215	669	2,247	0.058	0.539
Quatse	1,758	4	346	213	1,195	1,758	0.123	1.012
LOWER MAINLAND								
Chilliwack/Vedder	67,315	103	15,704	5,423	10,406	31,636	0.082	0.466
Alouette (South)	10,555	55	1,966	890	2,244	5,155	0.090	0.487
Chehalis	7,660	0	1,247	849	2,294	4,390	0.111	0.572
Cheakamus	2,692	0	1,727	23	65	1,815	0.008	0.668
Seymour	4,591	0	1,097	181	312	1,590	0.042	0.343
THOMPSON-NICOLA								
Thompson	6,249	32	4,038	5	129	4,204	0.006	0.687
CARIBOO								
Dean	5,256	525	7,285	5	30	7,845	0.087	1.515
Atnarko/Bella Coola	5,243	763	2,751	29	50	3,593	0.153	0.745
SKEENA MAINLAND								
Bulkley	15,631	1,514	9,208	9	166	10,897	0.095	0.715
Skeena	21,006	2,708	7,766	39	170	10,683	0.137	0.518
Babine	3,324	171	5,261	10	35	5,477	0.048	1.770
Morice	7,191	696	4,519	17	128	5,360	0.092	0.774
Zymoetz (Copper)	5,461	544	3,614	4	54	4,216	0.093	0.796
Kispiox	3,401	138	3,258	4	45	3,445	0.040	1.007
Kitsumkalum	4,621	478	2,247	0	10	2,735	0.101	0.578
Kitimat	5,587	652	1,593	29	93	2,367	0.119	0.416
Lakelse	3,318	161	1,636	6	28	1,831	0.049	0.516
QUEEN CHARLOTTE ISLANDS								
Yakoun	4,003	753	6,406	19	71	7,252	0.195	1.802

* From Appendix 4 (calculated from reported days fished and fish caught).
** From Appendix 5.

DISCUSSION

Trends in Catch and Angling Effort

The sale of steelhead licences has declined since its introduction twenty years ago. Initially, the licence fee was 25 cents for B.C. residents and $5.00 for nonresidents. The number of steelhead licences issued at that time averaged about 40,000. When resident fees were raised to $2.00, in 1971, licence sales dropped abruptly to near 30,000. Licence sales continued to decline gradually throughout the 1970's and early 1980's to a low of 20,600. This can be attributed to further increases in fees combined with decreases in steelhead stocks on some systems and the introduction of catch and release regulations. The 1986-87 season, however, reported an increase in licence sales and active anglers similar to numbers in the early 1970's (Fig. 2; Appendix 8).

There has been a substantial increase in the steelhead catch over the last three years as well as greater catch success (catch per angler day). During the years when licence sales and the number of active anglers were decreasing, the number of successful anglers remained fairly constant. This would indicate that the least successful anglers probably dropped out leaving the streams available to a group of more experienced fishermen. In the last two years, however, with so many more steelhead caught, the number of successful anglers has increased noticeably. About 60% of active steelhead fishermen caught a fish this season, whereas the long-time average was nearer 45% (Fig. 2; Appendix 8).

The provincial steelhead catch this year resulted in an average catch (kept and released) of 13 fish per successful angler. Catch success has been steadily improving since 1980. This year's catch per angler day was 0.71. Each angler devoted an average of 12 angler days to steelhead fishing in British Columbia (Appendix 8).

The dramatic increase in steelhead catch in recent years can be attributed to an increase in stock abundance in many streams resulting from a combination of factors: (1) an improvement in wild juvenile recruitment, (2) supplemental stocking with hatchery fry and smolts, (3) reduced harvest quotas, and (4) catch and release restrictions. The increase in total catch is also inflated by the fact that many released fish are caught more than once. Just how many times a released fish is recaptured is unknown, but it is evident on some rivers that the total catch by anglers exceeds the estimated run size. This year, only 8% of the wild steelhead catch was harvested by anglers compared to 26% of the hatchery fish catch. Prior to catch and release, more than half of the total steelhead catch was kept (Fig. 3; Appendix 9).

Provincial angling effort has been increasing steadily since the all-time low which occurred in 1981-82 (Fig. 3). Catch per angler day, which is a reflection of angling success, remained favourably high in all regions. The large number of hatchery fish caught on Vancouver Island was influenced particularly by the Stamp/Somass river system. The Lower Mainland catch, has increased markedly since 1982 due to substantial returns of hatchery fish to the Chilliwack/Vedder River. Catch in the Skeena Mainland, comprised almost entirely of wild fish,

has also been rising steadily since 1982 and was particularly high this season. The Cariboo area also reported an increase in catch over previous year's (Fig. 5; Appendix 5).

The Thompson-Nicola was the only area to show a decrease in both the number of days fished and the number of fish caught in 1986-87. Due to unexpected poor returns to the Fraser, Thompson, Chilcotin and Chilko rivers, an emergency steelhead release regulation was instituted on October 1, 1986, to help increase the spawning escapement. The result was a near 50% decline in angler effort on the Thompson River. Only 37 (1%) Thompson River steelhead were kept this year. This is a considerable contrast to the previous five year average for the Thompson area where the ratio of fish kept was 38%.

Response Bias

Steelhead biologists in Oregon and Washington conducting mailout questionnaire surveys of steelhead angling success have found a "positive response bias" in their results. In British Columbia, comparative results of the Steelhead Harvest Questionnaire with on-site creel surveys suggests a similar bias trend. The questionnaire may be producing inflated estimates of the steelhead catch (both kept and released). For those streams receiving over 400 angler days per year (the larger, more popular streams), the kill estimates from the questionnaire averaged 32% higher than kill estimates obtained from on-site creel surveys. The range in error was considerable (from 4% to 63%) indicating that the 32% overestimate should be applied selectively (Steelhead Harvest Analysis 1978-79, Fish and Wildlife Bulletin No. B-8). Creel survey results also indicate that estimates of fish released and angler days are even more inflated than estimates of steelhead kept.

Few anglers maintain a permanent record of fish released or the number of days spent fishing, so guesswork is often the only answer. More rivers in recent years have been stocked with hatchery fish and are exhibiting strong returns. Some anglers who are fishing these rivers regularly--some almost daily--record the number of steelhead kept but do not remember the number of days fished or the number of wild and hatchery fish released. The last couple of years, a few questionnaires have been returned incomplete rendering them almost useless.
Eliminating these anglers from the sample would considerably alter the catch and effort estimates for the rivers fished. So far, it has been possible to contact these anglers by telephone to clarify the information provided on the questionnaire and fill in the blanks. As long as anglers have continued success catching (and releasing) such large numbers of fish, this problem will continue. Of course, there is also the likelihood of some dishonest responses.

The comparison of creel survey and questionnaire results are not always reliable. Creel survey techniques have varied from intense sampling (Dean and Thompson rivers) and random interviews (Campbell and Quinsam rivers) to voluntary angler reports (Keogh and Chilcotin rivers). The results range from accurate to indicative, reflecting considerable differences when compared to the questionnaire survey.

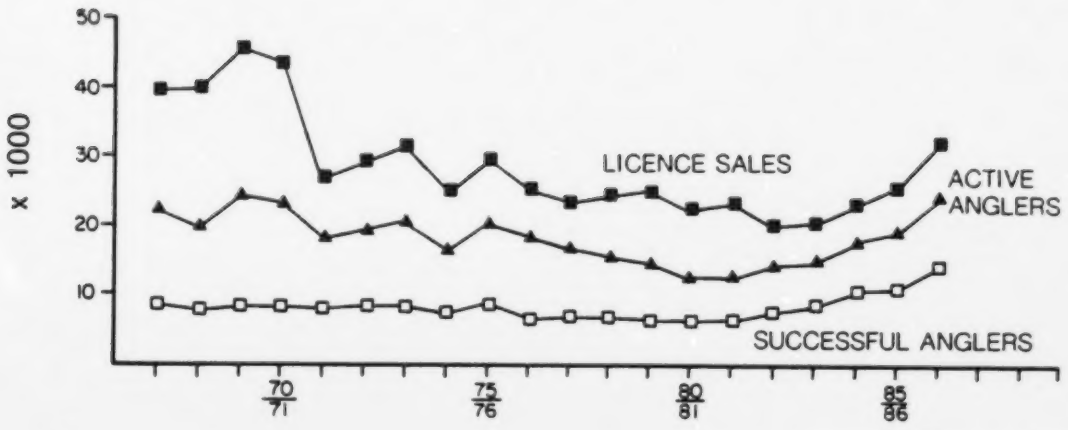

Fig. 2. Steelhead licence sales and the number of active and successful steelhead anglers in British Columbia since 1967-68.

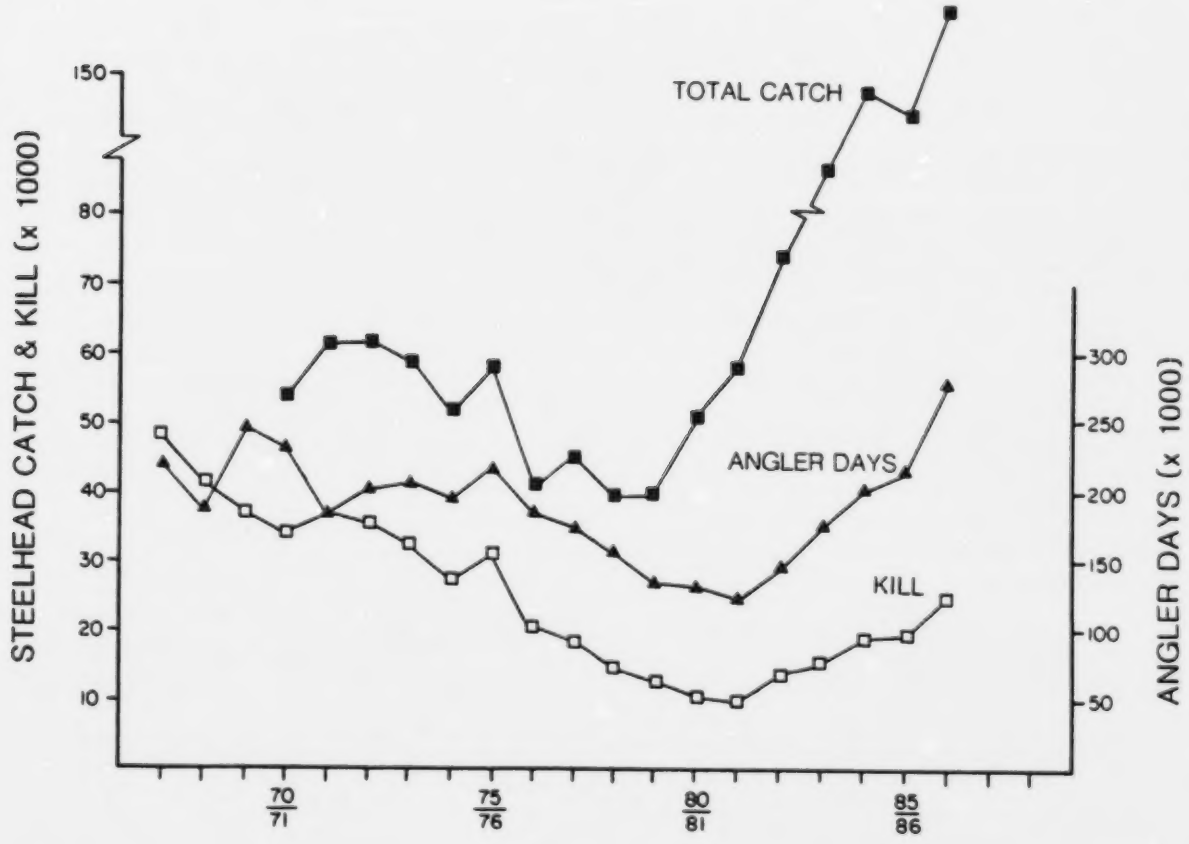

Fig. 3. Steelhead angling effort and catch success since 1967-68.

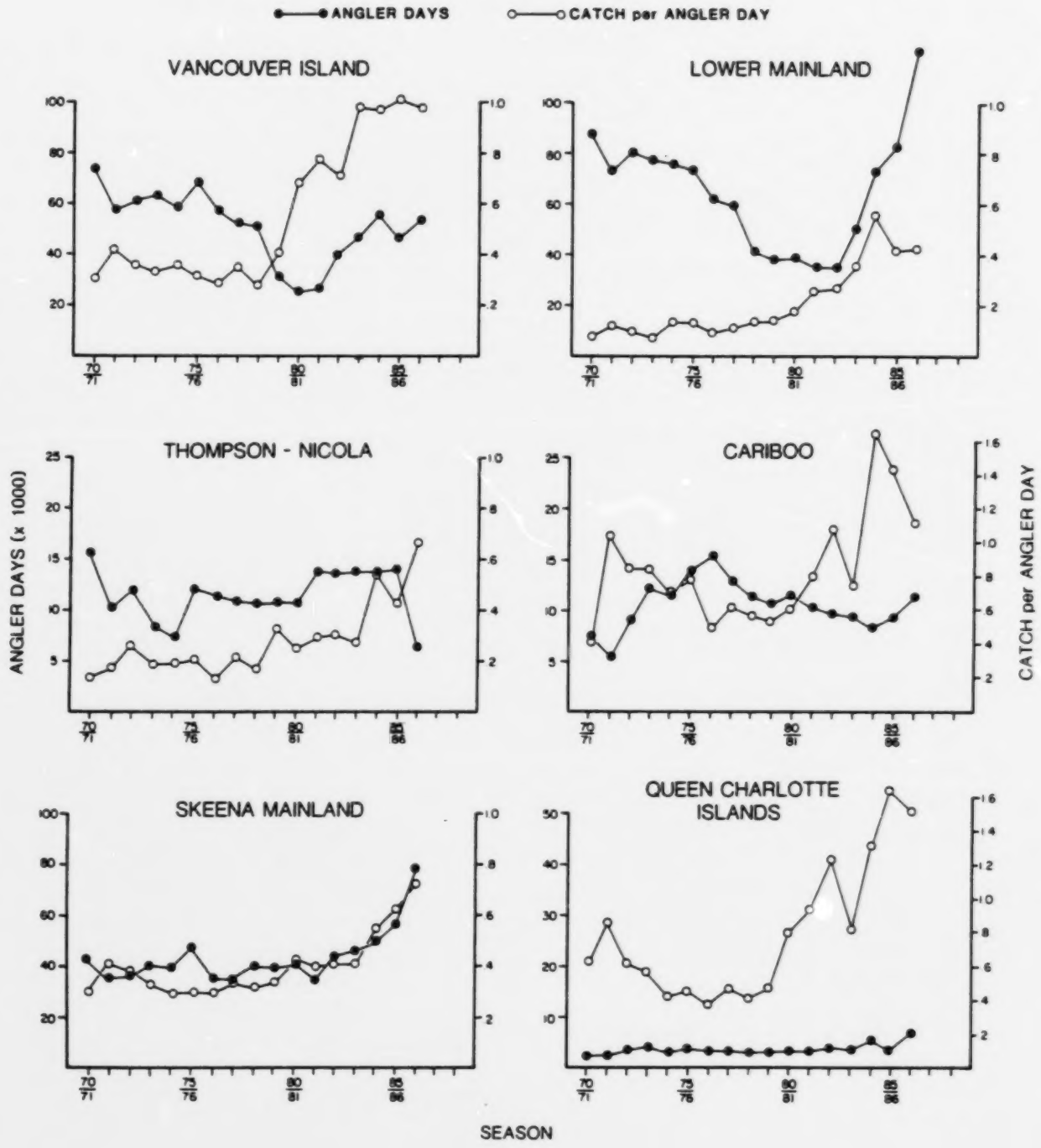

Fig. 4. Trends in steelhead angling effort and catch success for each area containing steelhead streams.

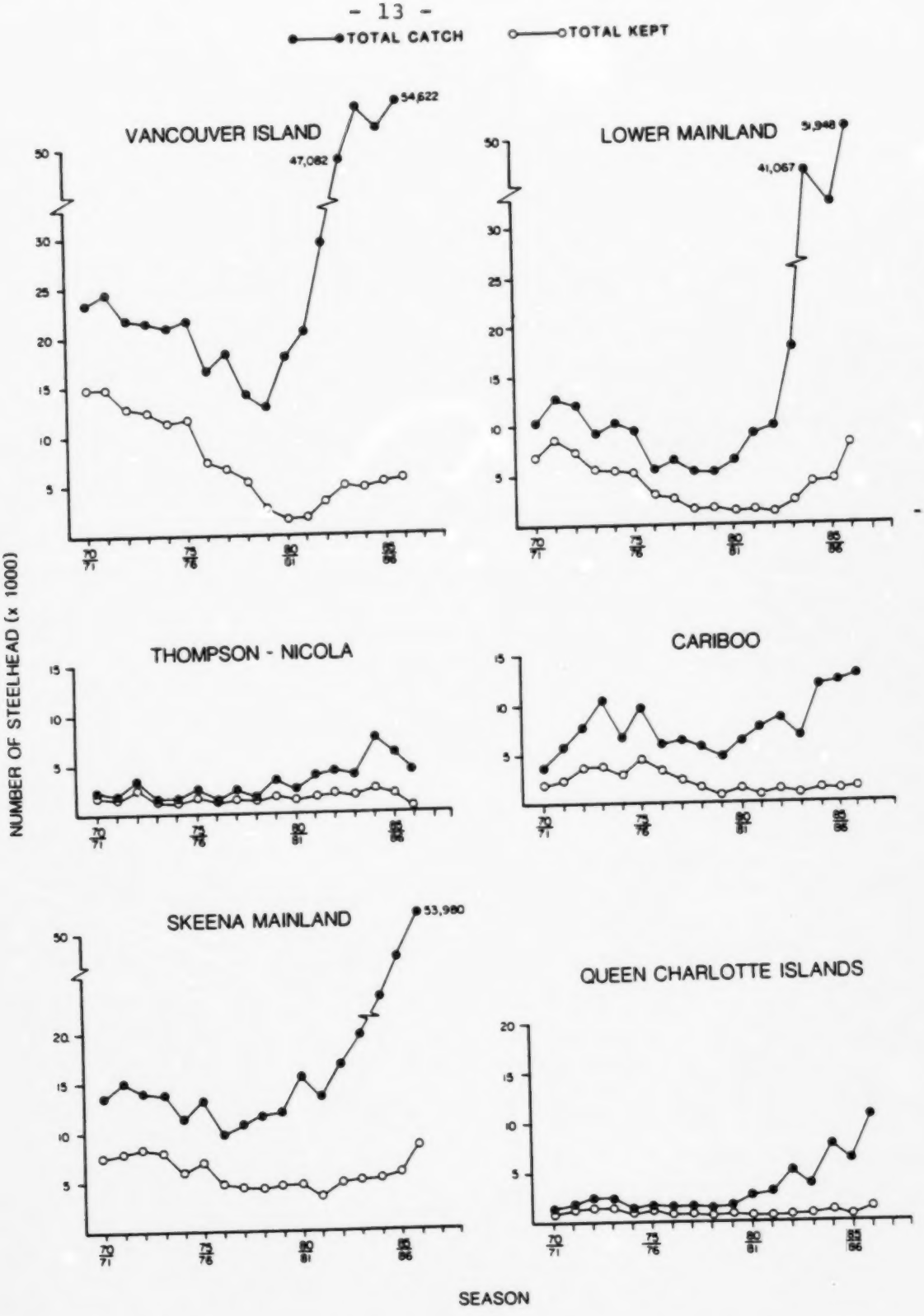

Fig. 5. Trends in total steelhead catch and kept for each area containing steelhead streams.

Throughout the years, the results of the Steelhead Harvest Analysis have been derived from a 50% response rate to a single mailout of the questionnaire. It has generally been assumed that the keenest, most active, and most successful anglers are the ones most likely to complete the questionnaire. If this was the case, when the number of fish reported caught was extrapolated to include all anglers, the resulting estimates would be inflated or positively biased due to the poor representation of inactive or dissatisfied anglers.

In 1978-79, and again in 1982-83, a second mailing of the questionnaire was undertaken to increase the response rate and, thus, attempt to arrive at a more accurate estimate of angling activity and success. When the results of both mailings were combined, the decrease in estimates of active anglers, successful anglers, angler days and total catch supported the possibility of response bias. If the majority of the remaining nonrespondents were found to be inactive or unsuccessful, as generally assumed, the estimates of active and successful anglers from the first mailing would be reduced considerably more. The results of a follow-up telephone survey in 1982-83 of a small random sample of Vancouver Island resident anglers who did not respond to either mailing, however, did not support the theory of response bias. Further effort is necessary if a reasonable estimate of response bias is to be determined, either through multiple mailings of the questionnaire or a telephone survey on a much broader scale. In the meantime, the analysis results present a useful indication of increasing and decreasing trends in stock status and angling activity. It's usefulness to fisheries managers is strongly recognized in British Columbia.

JUVENILE STOCK MONITORING IN BRITISH COLUMBIA (SUMMER-FALL 1987)

There are many significant influences affecting the successful management and use of steelhead populations. Sufficient spawners are needed to seed streams to their varied and specific capacities. Spawner numbers vary from year-to-year with changes in the environment and harvest rates. Special management tools have been developed recently that permit gauging of spawner escapement (run strength) and forecasting of future run size. This diagnostic tool is called juvenile stock monitoring and its product should be of keen interest to managers and recreational anglers alike.

Juvenile stock monitoring recognizes that streams throughout the province have differing biological productivities and physical constraints, which means they have varying abilities to support steelhead. It directly measures the abundance of juvenile steelhead in important, selected streams during summer limiting flows. Whether or not the actual marine or freshwater harvest is known, juvenile fish densities in the stream alert biologists to the adequacy of spawner escapement. Reflection on unusual streamflow conditions (floods, droughts) provide further clues on the survival of juvenile fish. Maximum abundance of juveniles in ideal habitat observed over all sampling stations, in 1987, promise maximum adult returns in the future.

There is a four to seven year lag from steelhead fry to adult stage, and past juvenile population surveys have reliably yielded clues and

warnings to adult run size in advance. Juvenile monitoring can objectively point out where more conservative regulations must be invoked in time to compensate for poor adult returns, or to flag streams for emergency hatchery stocking.

Monitoring of all 'wild' stocks in the province is not practical. A limited amount of effort was spent, in 1987, describing stock status for a few selected streams. Neighbouring streams can have vastly different productivities, habitat problems, or hatchery return rates. The monitoring results are, therefore, stream specific and cannot necessarily be used to estimate run sizes on nearby streams. Sufficient samples or 'index' stations within a singular stream can describe the status of that specific steelhead population. Juvenile stock monitoring is not influenced by the usual prejudice and ambiguity which tends to bias creel and 'winter' snorkel surveys.

This section reports on the result of juvenile stock monitoring and its consequences to fisheries managers and steelhead anglers. Where stream flow and other physical data is available, these clues have been included.

Vancouver Island

Two streams, the Nimpkish and Keogh rivers, were censused in 1987. The Nimpkish was part of an initial reconnaissance directed at a suspect problem—a depressed steelhead population. Most index stations on the Nimpkish were found to contain less than 34% of the expected number of steelhead fry. Steelhead parr densities were barely detectable. Given the relatively large amount of usable habitat in the Nimpkish River and the low habitat saturation, future stocking with hatchery fish holds much promise. However, the low productivity of the river caused by limited nutrients means fewer adults can be expected for so large a stream. In all likelihood, Nimpkish steelhead would be especially vulnerable to overfishing if a harvest was permitted.

Monitoring of juvenile steelhead in the Keogh River, in 1987, detected an abrupt reduction in fish abundance. This was not surprizing following the end of a recent experiment in which fertilizer was added to the river to increase its productivity. Since fertilization is no longer being added, the river's nutrient level has dropped again. Despite this, more than sufficient spawner numbers were present to seed the Keogh to its 'natural' capacity. Future adult returns can be expected to be average to above average. Angler use on the river has quadrupled from 434 days fished in 1985-86 to 1,649 days in 1986-87 following news of a run size greater than 4,000 adults per year.

Lower Mainland

Considerable fisheries expertise was applied to a number of important steelhead fisheries in 1987. Some populations have been monitored for eleven consecutive years. This effort was well justified given the large number of angler days used to catch steelhead. Some 43.1% of the provincial angler effort was applied in the Lower Mainland during 1986-87 and is increasing.

The Chilliwack/Vedder River is the single most important stream in the province for steelhead catch and angling effort by residents of B.C. Optimal numbers of fry and parr were found along the entire mainstem length. There was a greater catch and harvest of hatchery adults compared to recent years. This increased harvest resulted in a minor reduction in fry numbers since fewer adults spawned but there was also an increase in fry size. Excellent stream conditions and growth of juveniles suggest they have the best chance of surviving to smolt stage. Flows were unusually low but, in this large river, more usable habitat was available. The forecast is for a larger than average return of wild adults in 1992-93 winter season.

The Squamish River is a large glacial stream containing few but large (trophy sized) adults. Recent reconnaissance has attempted to measure the usable habitat in sidechannels to better estimate the number of spawning steelhead necessary to reseed the system. Young steelhead have not been found rearing in the mainstem Squamish River. Rather, they are found in the clearer, warmer, and nutrient richer sidechannels. Juvenile abundance in the sidechannels was excellent in 1987. The forecast is for better than average returns in the winter-spring of 1992-93.

Stocking of hatchery fry was discontinued on the Silverhope River in recent years since there have been adequate steelhead adult returns. Harvest analysis results and snorkel surveys of the summer steelhead population revealed low returns in 1986 (spawning in 1987). Despite this, the abundance of fry was high suggesting there were sufficient spawner numbers to seed available habitat. Silver Lake is known to hold adult steelhead prior to spawning time and this prevents accurate adult counts in most years. The Silverhope will continue to be regulated as a catch-and-release fishery, and given the consistent 100% habitat saturation since 1982, further juvenile monitoring will not be done. The forecast is for better than average returns in the future.

Continued juvenile and habitat monitoring in the Coquihalla River revealed a system with fluctuating capability for fish production. The transport and deposition of unusual amounts of sand through the stream continues to be a problem for fish survival, food production, and habitat quality. Of concern is the 1987 fry abundance—the lowest in recent years. Juvenile numbers are lower probably as a consequence of habitat degradation following construction of the Coquihalla Highway and continued road building along Sowaqua Creek. The forecast is for reduced returns of adults in the summer of 1992. The stream appears to be operating near 60% of its former capability even though there were sufficient spawners and hatchery fry were stocked in 1987. Neighbouring streams without habitat degradation and similar productivity currently support significantly more juveniles per unit stream area.

Thompson-Nicola

The Thompson-Nicola system is an important steelhead producer particularly given the 'trophy' size of the adults. During the 1985-86 season some 14,000 angler days were spent in search of steelhead in the Thompson. In addition, a large fraction of the 16,900 angler days on the Fraser River were directed at Thompson River steelhead. The total

Thompson effort is in excess of 22,450 angler days or 10.4% of the provincial total.

The first ever structured sampling of the Thompson-Nicola was completed in 1987 following emergency closure of the sport fishery in October, 1986. Earlier juvenile sampling suggested that a particularly weak brood year was partly responsible (eg. 1982 Nicola River juvenile monitoring).

It would appear from juvenile stock monitoring that the decision to close the Thompson River to a kill fishery was an effective method of buffering against a poor spawning escapement which would result in low returns in future. The closure ensured that enough steelhead spawned, the result being that mainstem habitats were adequately seeded. Major differences in productivity were noted between the Thompson (less productive) and the Nicola (more productive) rivers. The forecast is for a normal return of adults in the fall of 1991.

Skeena Mainland

The Skeena River and its tributary rivers supported 27.5% of the total provincial steelhead angler days and 70.3% of the total wild steelhead harvest in 1986-87. This is the only region where there is a significant harvest of wild steelhead. The steelhead sport harvest (not including released fish) from the Skeena system in 1986-87 was 8,055 adults which is a near record high; the harvest was 5,653 adults in 1985-86. It is not possible to accurately determine the run size of each river which flows into the Skeena, so management of each river's steelhead stocks is different.

There is continuing concern over excessive interception of Skeena River steelhead. Both commercial and native fisheries intercept steelhead. Whether specific streams are sufficiently seeded is being addressed by juvenile stock monitoring.

Monitoring of juvenile steelhead in the Kispiox River has been conducted annually since 1980. Results for 1987 indicate that all mainstem and tributary habitats were adequately seeded. The larger fry abundance was associated with an apparently large run size to the Skeena indicated by good angling success and favourable incubation conditions. The forecast is for a better than average return of adults in 1993-94.

The Babine River was selected for a special reconnaissance in 1987. An increase in angler use and steelhead harvest is anticipated as a result of improved logging road access. Juvenile stock monitoring and habitat assessment of the Babine and its tributaries will give fisheries managers an understanding of the steelhead population's vulnerability to overharvest.

Relatively high juvenile densities were measured at all index stations on the mainstem Babine and in non-glacial tributaries. The result is that usable habitat was adequately seeded to those standards seen in streams with similar productivity. Complete saturation of habitat with fry was expected given earlier estimates of record high run

size and wild steelhead release regulations. The forecast is for better than average adult returns in the fall of 1992-93.

Outlook

In 1988-89, better than average adult returns are expected for the Keogh, Chilliwack, Coquihalla, Siverhope, Salloomt, and Kispiox rivers. There is no stock monitoring data of sufficient scope to make comment on other streams (eg. Thompson).

INTERPRETATION OF HARVEST ANALYSIS RESULTS FOR 1986-87

It is commonly understood that stream flow conditions affect steelhead run-timing and distribution throughout the river, as well as angler effort, catch, and catch per unit effort. Data on several streams on Vancouver Island have been recently examined to provide insight on how best to interpret Steelhead Harvest Analysis statistics. Two streams, namely the Cowichan River and the Gold River, were selected on the basis that each has a high catch of wild adults but they have contrasting flow regimes. Cowichan Lake, at the head of Cowichan River, acts as a large water reservoir which buffers and stabilizes the release of flood waters to the river. The Gold River does not have a large lake in its headwaters and is much faster to respond to winter freshets.

Catch results, comprised mainly of released fish, for the Cowichan River were relatively low (3,923 adults) in 1986-87 following two consecutive years of high catch (7,221, 5,077). This was disturbing since a large return of hatchery adults was expected. Flows in the Cowichan during the winter fishing season (January to March) were unusually high, but stable as a result of Cowichan Lake. Information from detailed angler log notes showed that flows greater than 1.5 times the mean (average) annual discharge (MAD) are excessive on the Cowichan River. At these high flows, river access and the likelihood of catching a steelhead is poor.

Catch-and-release regulations were imposed, in 1978-79, on the Cowichan River causing angler effort to drop to record lows between 1980 and 1982. Angling effort has since recovered as some anglers have grown to accept release fisheries in specific areas. Total steelhead catch and the number of 'fishable' days on the Cowichan River have been compared since 1983, when fishing activity returned to normal. The comparison reveals a positive correlation showing that the greater the number of fishable days, the higher the total catch of steelhead for the season. Depending on the year, the number of fishable days during the January-March fishing season varied from 12 to 90. The maximum season length on the Cowichan River is 90 days. The 1983 season was particularly poor for fishing with flows averaging 2.5 times MAD; anglers were forced to fish in the trees along the stream bank. The 1985 season was particularly good for fishing with flows averaging 0.6 times MAD; shore anglers could find more holding water. The 1987 season only had 19 fishable days with flows averaging 2.0 times MAD. However, the total catch per fishable day, in 1987, was exceptionally high at 206 adults. This compares to an average of 141 adults per fishable day.

What size of run occurred in 1987? No one knows for sure but casual streamside and snorkel observations suggest there was adequate fry seeding in parts of the mainstem.

The total catch, in 1986-87, for the Gold River was slightly below the average catch since 1983. Catch was relatively low for three consequtive years following the introduction of catch-and-release regulations. Flow conditions were near normal in 1986-87 producing 44 fishable days out of a winter season (December-March) of 121 days. Since there is no significant lake buffering on the Gold River, flows are often either extremely high or too low to offer good fishing. The best catch per fishable day occurred in the 1984 and 1985 seasons (catch of 160 fish per day), and the worst occurred in the 1980 season (catch of 18 fish per day).

It remains unclear for most streams with catch-and-release fisheries, exactly how catch per fishable day relates to actual run size. Run size estimates are generally unavailable on major steelhead streams. It is very apparent in studied streams that catch reflects several fold increases over the predicted run size and maximum harvest numbers of the past. There should be sustained efforts to better evaluate or guage run sizes with other diagnostic tools. Particular care will have to be made on some streams where catch per fishable day remains unusually low. The Steelhead Harvest Analysis will continue to be a valuable management tool in concert with other clues.

TRENDS AND FORECASTS OF WINTER-RUN STEELHEAD AT THE KEOGH RIVER

The fisheries Research and Development Section has monitored the wild steelhead population of the Keogh River, on northern Vancouver Island, since 1975. Various components of steelhead life history were examined. The goal was to develop methods for use by fisheries biologists in forecasting steelhead returns to rivers in years ahead.

Fish populations were monitored by operating a fish counting fence at the mouth of the Keogh River. Steelhead adults were trapped as they entered the river to spawn and again as they returned to sea as kelts. Steelhead smolts, migrating to the ocean in the spring, were also captured. A comparison of information over the years showed trends in both steelhead smolt and adult migrants. The number and age of adults returning to spawn was examined and compared to their size as smolts. Although preliminary, these results have been used in developing mathematical models to forecast adult run sizes.

Smolts

Smolt numbers from the Keogh River have varied widely from lows of about 2,000 fish in the late 1970's to current levels averaging 10,000 fish (Fig. 6). Recent increases in smolt numbers were apparent on other rivers as well (eg. Quinsam River).

The average size (fork length) of smolts varied from year to year (Fig. 7) and was closely associated with their age. The reasons for natural changes in age of smolting remain vague. Association with pink

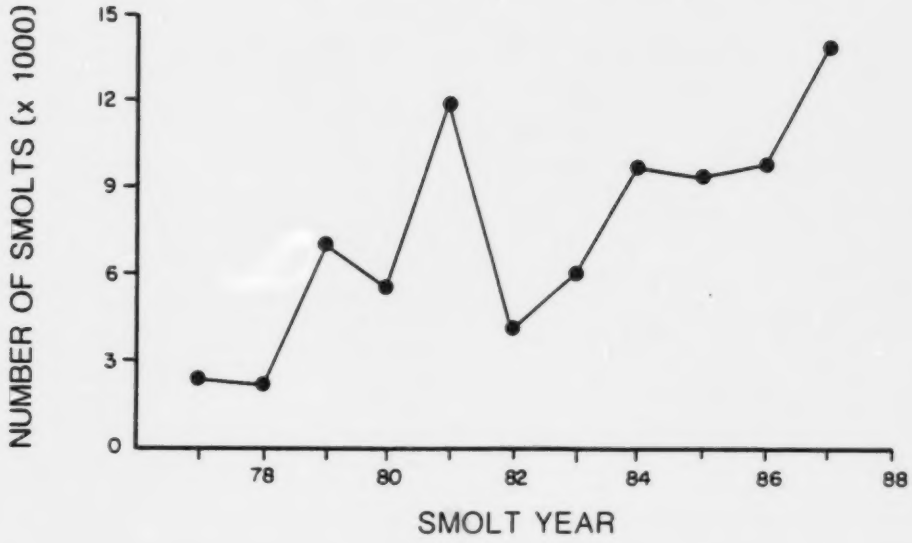

Fig. 6. Steelhead smolt yield of the Keogh River from 1977 to 1987.

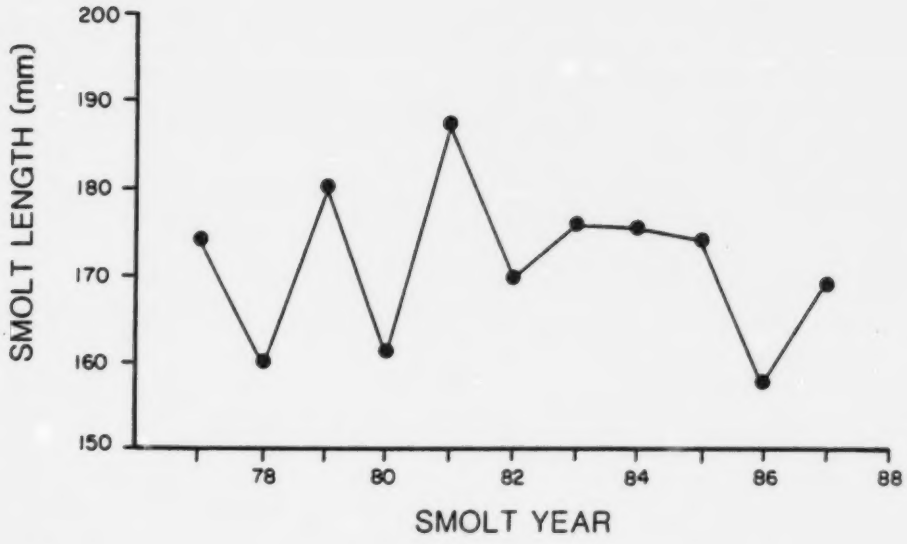

Fig. 7. Mean length of steelhead smolts during the spring migrations from 1977 to 1987.

salmon run size is suggested. Pink salmon spawning runs fluctuate every second year. On the north Island, the run is plentiful during even years and weak during odd years. This means an abundance of pink salmon eggs and fry for juvenile steelhead to feed on every second year which may improve growth and overwinter survival.

Stream enrichment experiments on the Keogh River have caused an increase in stream nutrient levels, production of algae and the number of aquatic insects on which fish feed. This, in turn, has resulted in a change in smolt size and age. Before enrichment, 30% of the smolts spent two years in the river. After enrichment, 70% of smolts were age two. This is evidence that, prior to enrichment, food supply was limited.

The Keogh has not been typical of north Vancouver Island streams in recent years because of the alterations to stream trophic levels induced by nutrient addition. Smolt output has been above average, but the end of stream fertilization experiments combined with a drought, in 1987, will likely result in relatively fewer smolts for the next few years.

Adults

A better than average adult run was expected for the Keogh River in 1986-87. In fact, the population estimate at the counting fence was the highest ever observed (Fig. 8). Run sizes in the mid-1980's have been sizeable, contrasting strongly with the very low spawning population of 1979 and 1980. Steelhead populations on other Vancouver Island streams appear to follow a similar ten year cyclic pattern based on the catch success data from past harvest analyses.

For ease of comparison, returns of wild adults have been compiled by smolt year. This allowed estimation of the age composition and the survival rate from smolt to adult.

Adult Age

Scales were taken from steelhead adults as they passed through the fence and were used to determine freshwater and saltwater age of the fish. The age of steelhead adults varied considerably from year to year (Fig. 9). For example, the percentage of males that spent three years in salt water (.3) before returning to spawn ranged between 15% (1981 smolts) and over 60% (1983 smolts). Females with three saltwater years ranged between 25% (1981 smolts) and almost 80% (1984 smolts). The age composition of males and females parallel each other but for two smolt years (1978 and 1983). Clearly, age composition of adults from smolt groups is not constant. Consequently, there is much variation in both age and number of spawners between steelhead runs. Reasons for the difference in the number of years steelhead spend in the ocean is not well understood, but may be related to smolt size and age. On the average, as freshwater age increased saltwater age decreased.

Marine Survival

The pattern of survival in the marine environment (Fig. 10) was similar to the trend in smolt length (Fig. 7). In fact, with the

exclusion of 1982, it appears that high marine survival is directly related to larger smolt size. The returns from 1982 smolts were much higher than expected based on smolt length. Possibly, this is related to better rearing conditions in the marine environment associated with the 1982-83 El Niño event.

Forecasts

The means to forecast run sizes has been provided by observing these relationships: (1) smolt number and adult return; (2) smolt size and marine survival; and (3) freshwater age (including size at freshwater age) and marine age. These forecasts can only serve fisheries biologists as rough guides of what to expect, based on the past history. There is currently no means to predict the effects of varied marine conditions and interactions with other fish stocks. Complex factors such as climatic changes, releases of hatchery fish and the dynamics of other salmonids may alter the marine distribution and survival of steelhead.

Approximately 800 wild adults are expected to return to the Keogh River in 1987-88 and 1,400 in 1988-89 (Fig. 8), plus repeat spawners. This is near an average escapement. Typically, 1,000 spawners will produce 7,000 smolts which, surviving at average rates, can in turn be expected to yield about 1,000 adults. Less than optimal rearing conditions in the river (eg. drought of 1987) or the marine environment (eg. changes in sea-surface temperature) may dramatically alter this apparent equilibrium.

Hatchery Returns

Fewer hatchery fish will spawn in the Keogh during the 1987-88 and 1988-89 season. On the Keogh River, about 16% of wild smolts survive to returning adults. Survival of hatchery smolts to returning adults, however, has averaged less than half that (only 6.5%). Based on these percentages, about 1,100 hatchery adults can be expected to return from hatchery smolts released in 1986.

On average, an equal proportion of hatchery fish returning to the Keogh River spend two and three years in salt water. Therefore, about 550 hatchery returns of two-year ocean age are expected in the 1988 season (there will also be repeat spawners from 1987). There were no hatchery smolts released in 1985 so there will be no large hatchery adults in the 1988 run. The release of pen-reared, hatchery smolts in 1987 was intentionally reduced in number but still should provide for a reasonable catch of hatchery fish from 1989 on.

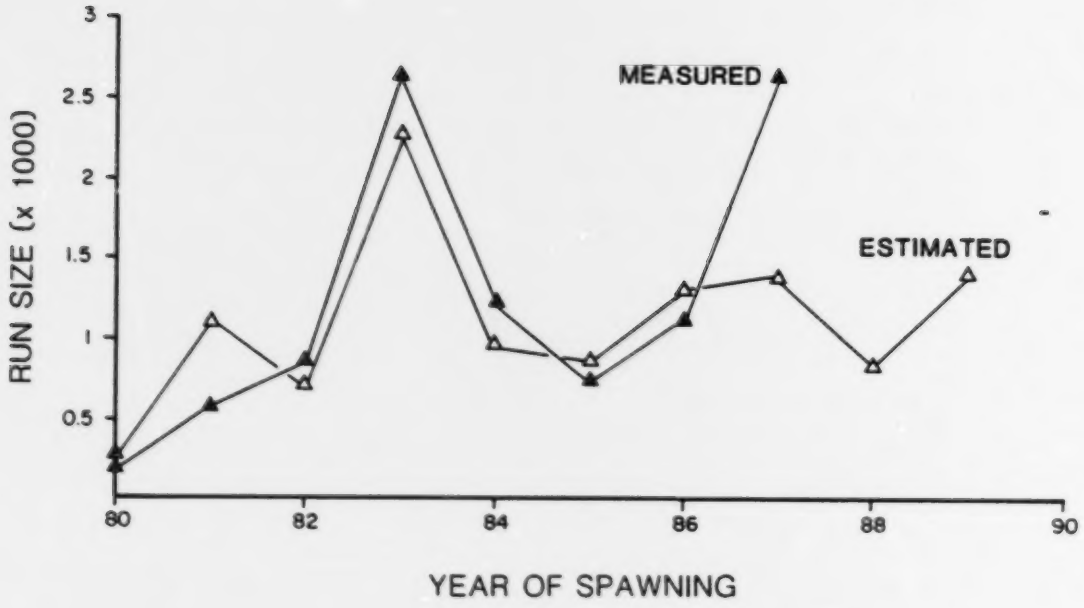

Fig. 8. Comparison of the adult run size estimates (1980 to 1987) and model predictions, with forecasts of the Keogh runs to 1989.

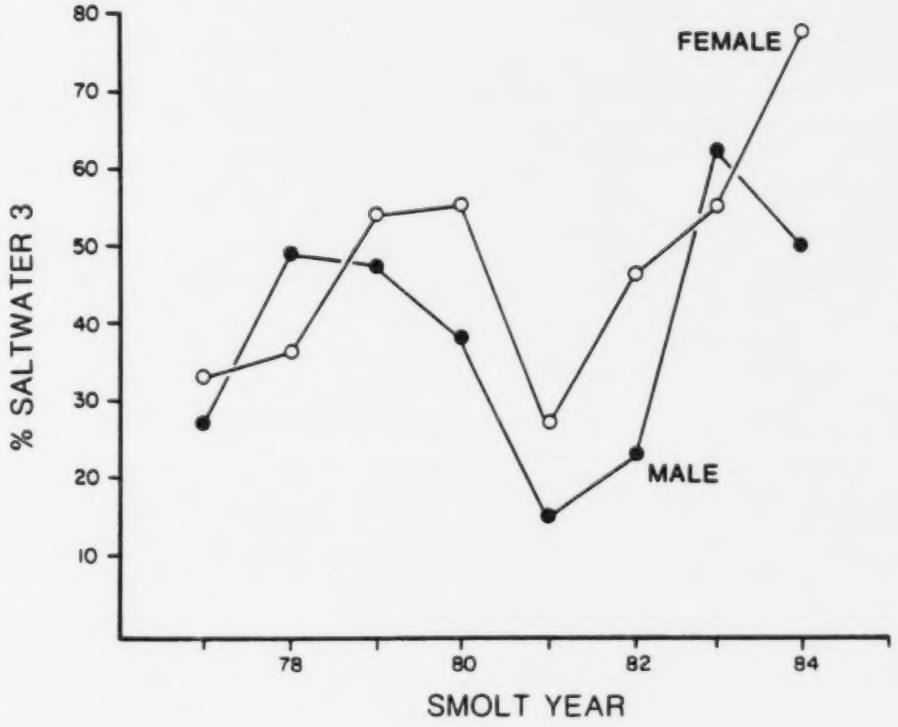

Fig. 9. The percent composition of saltwater age 3 adult returns from Keogh smolts emigrating from 1977 to 1984.

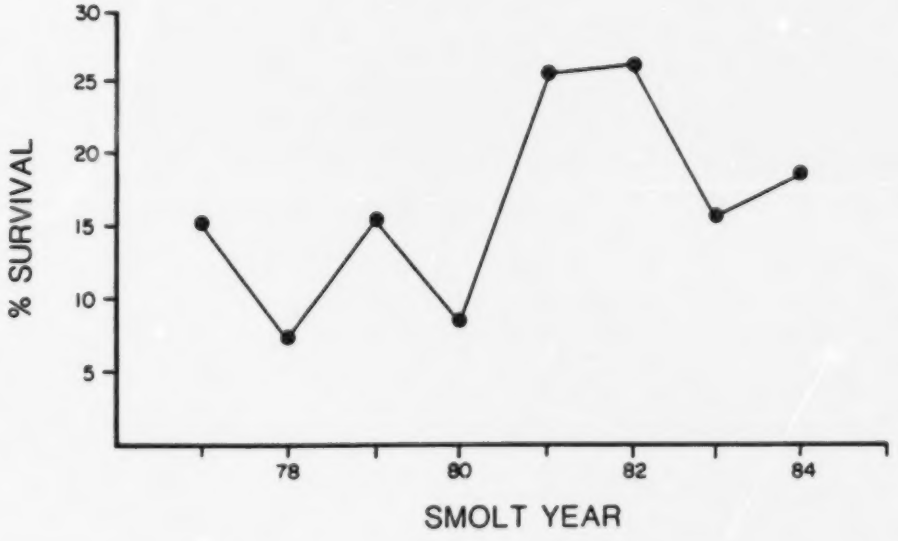

Fig. 10. Smolt-to-adult survival rates (%) for Keogh adult returns from the smolts of 1977 to 1984.

Appendix 1. 1987 Juvenile steelhead releases from Provincial (MOE), Federal (DFO), and Public Involvement (Public) fish culture facilities.

Stream	Facility	Fry & Parr Released	Smolts Released	Predicted Adult Returns*	
VANCOUVER ISLAND					
Cameron R.	Big Qualicum Hatchery (DFO)	7,457		60	wr
Campbell R.	O'Connor Lk. netpens (Public)		28,693	860	sr
Cowichan R.	Cowichan Lake netpens (MOE)		55,666	2,200	wr
Englishman R.	Vancouver Island Hatchery (MOE)	45,858		230	wr
	Cobble Hill netpens (MOE)		34,127	1,380	wr
Grilse Cr.	Vancouver Island Hatchery (MOE)	50,805		400	wr
Keogh R.	O'Connor Lk. netpens (Public)		16,858	670	wr
L. Qualicum R.	Little Qualicum Hatchery (DFO)		29,886	1,200	wr
Millstone R.	Big Qualicum Hatchery (DFO)		10,079	400	wr
Nanaimo R.	Vancouver Island Hatchery (MOE)	6,934		50	wr
	Cobble Hill netpens (MOE)		52,038	2,080	wr
Puntledge R.	Puntledge Hatchery (DFO)		11,448	460	wr
			10,898	330	sr
Qualicum (Big) R.	Big Qualicum Hatchery (DFO)		24,803	990	wr
Quatse R.	O'Connor Lk. netpens (MOE)		18,031	720	wr
Quinsam R.	Quinsam Hatchery (DFO)	13,450	23,823	1,060	wr
Salmon R.	Vancouver Island Hatchery (MOE)	102,587	2,336	900	wr
Somass R.	Robertson Cr. Hatchery (DFO)		102,318	4,090	wr
			54,503	1,630	sr
Tsitika R.	Vancouver Island Hatchery (MOE)	15,383		120	sr
LOWER MAINLAND					
Ashlu R.	Tenderfoot Hatchery (DFO)	23,786		120	wr
Bear Cr.	Fraser Valley Hatchery (MOE)	1,614		10	wr
Big Silver Cr.	Chehalis Hatchery (DFO)	10,561		420	wr
Birkenhead R.	Birkenhead Hatchery (DFO)	6,553		50	wr
Brunette R.	Alouette R. Corrections (MOE)		7,743	310	wr
Capilano R.	Capilano Hatchery (DFO)		15,496	620	wr
Chehalis R.	Chehalis Hatchery (DFO)		68,592	2,740	wr
			26,477	1,060	sr
Chilliwack R.	Chilliwack Hatchery (DFO)		123,048	4,920	wr
Cogburn Cr.	Chehalis Hatchery (DFO)		9,250	370	wr
Coquihalla R.	Fraser Valley Hatchery (MOE)	55,601		440	sr
Elaho R.	Tenderfoot Hatchery (DFO)	23,786		190	wr
Hurry Cr.	Seymour Hatchery (DFO)	3,004	508	40	wr
		10,000		80	sr
Junior Cr.	Seymour Hatchery (DFO)	7,312		60	sr
Kanaka Cr.	Bell-Irving Hatchery (DFO)		5,768	230	wr
L. Campbell R.	L. Campbell Hatchery (Public)		6,605	260	wr
Mamquam R.	Tenderfoot Hatchery (DFO)	23,258		110	wr
Nicomekl R.	Fraser Valley Hatchery (MOE)		14,168	570	wr
S. Alouette R.	Alouette R. Corrections (MOE)		13,827	800	wr
Serpentine R.	Fraser Valley Hatchery (MOE)	4,808		40	wr

Appendix 1. (continued)

Stream	Facility	Fry & Parr Released	Smolts Released	Predicted Adult Returns*	
Seymour R.	Seymour Hatchery (DFO)		13,939	560	wr
Squamish R.	Tenderfoot Hatchery (DFO)	23,790		120	wr
Stave R.	Alouette R. Corrections (MOE)		8,831	350	wr
Tamahi Cr.	Chilliwack Hatchery (DFO)	7,334		60	wr
THOMPSON-NICOLA					
Bonaparte R.	Spius Cr. Hatchery (DFO)	280,100		2,240	wr
Coldwater R.	Spius Cr. Hatchery (DFO)	104,000		830	wr
Maka Cr.	Spius Cr. Hatchery (DFO)	36,800		290	wr
Spius Cr.	Spius Cr. Hatchery (DFO)	38,800		300	wr
Thompson R.	Spius Cr. Hatchery (DFO)	88,136		700	wr
CARIBOO					
Atnarko R.	Snootli Hatchery (DFO)	32,287		260	wr
Blue Lk.	Snootli Hatchery (DFO)	21,609		170	wr
Noosgulch R.	Snootli Hatchery (DFO)	20,000		160	wr
Salloomt R.	Snootli Hatchery (DFO)	60,065		480	wr
SKEENA MAINLAND					
Bulkley R.	Fraser Valley Hatchery (MOE)	30,915		250	sr
Date Cr.	Kispiox Hatchery (DFO)	8,500		70	sr
Harold Price Cr.	Toboggan Cr. Hatchery (DFO)	123,462		990	sr
Kitsumkalum R.	Deep Cr. Hatchery (Public)	16,934		140	wr
Kitimat R.	Kitimat Hatchery (DFO)		54,035	2,160	wr
McCulley Cr.	Kispiox Hatchery (DFO)	11,500		90	sr
Morice R.	Fraser Valley Hatchery (MOE)	83,300		670	sr
Trout Cr.	Toboggan Cr. Hatchery (DFO)	56,872		460	sr
Zymoetz R.	Fraser Valley Hatchery (MOE)	25,150		200	sr
PROVINCIAL TOTAL		1,482,311	843,794	44,820	

* Predicted adult returns based on Tautz and Slaney, 1982, Biostandards

Fry to adult survival:	fry < 1.0g	0.5%
	fry > 1.0g	0.8%
Smolt to adult survival:	summer-run (sr)	3%
	winter-run (wr)	4%

Appendix 2 - NUMBER OF STEELHEAD LICENCEES, QUESTIONNAIRES AND RESPONDENTS BY RESIDENT AREA, 1986-87

RESIDENT AREA	LICENCEES	QUESTIONNAIRES MAILED	RESPONDENTS	NOT USEABLE*	RESPONSE RATE (%)	LICENCEES SAMPLED (%)
1 VANCOUVER ISLAND	5004	2771	1214	250	48.16	24.26
2 LOWER MAINLAND	12929	5641	2800	529	54.77	21.66
3 KAMLOOPS	741	377	235	25	66.76	31.71
4 KOOTENAYS	276	140	85	17	69.11	30.80
5 CARIBOO - CHILCOTIN	1088	595	313	32	55.60	28.77
6 SKEENA	6476	3255	1563	257	52.13	24.14
7 OMINECA - PEACE	1786	1019	546	93	58.96	30.57
8 OKANAGAN	575	298	174	24	63.50	30.26
9 NON - RESIDENT (CANADIAN)	1361	1213	714	69	62.41	52.46
0 NON - CANADIAN	2485	2226	1151	106	54.29	46.32
TOTAL	32721	17535	8795	1402	54.52	26.88

* Includes questionnaires that were :
  1. returned by the post office as undeliverable, or
  2. spoiled.

Appendix 3 - ESTIMATE OF ACTIVE AND SUCCESSFUL STEELHEAD ANGLERS BY RESIDENT AREA, 1986-87

RESIDENT AREA	LICENCEES	RESPONDENTS	REPORTED ACTIVE ANGLERS*	ACTIVE ANGLERS (%)	ESTIMATED ACTIVE ANGLERS	REPORTED SUCCESSFUL ANGLERS**	SUCCESSFUL ANGLERS (%)	ESTIMATED SUCCESSFUL
1	5,004	1,214	936	77.1%	3,858	603	64.4%	2,484
2	12,929	2,800	2,045	73.0%	9,438	1,059	51.8%	4,889
3	741	235	135	57.4%	425	80	59.3%	252
4	276	85	60	70.6%	195	28	46.7%	91
5	1,088	313	219	70.0%	762	139	63.5%	483
6	6,476	1,563	1,080	69.1%	4,475	696	64.4%	2,882
7	1,786	546	409	74.9%	1,338	230	56.2%	752
8	575	174	122	70.1%	403	71	58.2%	234
9	1,361	714	631	88.4%	1,203	365	57.8%	695
0	2,485	1,151	1,053	91.5%	2,274	833	79.1%	1,798
TOTAL	32,721	8,795	6,690	76.1%	24,371	4,104	61.3%	14,560

* Number of respondents who actually fished for steelhead.

** Number of respondents who actually caught steelhead (whether kept or released).

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
1	ADAM RIVER	21	82	7	25	1	4	54	234	0.048	2.619	1
3	AMOR DE COSMOS RIVER BEAR R.	34	129	16	59	2	8	75	252	0.059	2.265	3
6	ASH RIVER	44	176	19	76	13	53	32	129	0.295	1.023	6
9	BENSON RIVER	2	8	1	4	0	0	2	8	0.000	1.000	9
10	BIG QUALICUM RIVER QUALICUM R.	931	3642	202	810	96	383	501	1953	0.103	0.641	10
11	BLACK CREEK	5	20	2	8	0	0	0	0	0.000	0.000	11
13	BROWNS RIVER	2	6	2	6	0	0	3	12	0.000	1.500	13
14	BURMAN RIVER	26	100	7	22	1	4	69	275	0.038	2.692	14
15	CAMPBELL RIVER	884	3376	198	690	36	147	538	2143	0.041	0.649	15
16	CAYCUSE RIVER	35	145	7	28	0	0	38	159	0.000	1.086	16
17	CAYEGHLE CREEK	19	78	5	20	0	0	5	20	0.000	0.263	17
18	CHASE RIVER	5	20	1	4	0	0	4	16	0.000	0.800	18
19	CHEMAINUS RIVER	59	242	16	65	0	0	26	107	0.000	0.441	19
20	CHINA CREEK	63	261	13	54	7	28	94	389	0.111	1.603	20
21	CLUXEWE RIVER	100	399	28	107	7	25	146	575	0.070	1.530	21
22	COLEMAN CREEK	3	12	1	4	0	0	3	12	0.000	1.000	22
23	COLONIAL CREEK	8	32	3	12	0	0	5	20	0.000	0.625	23
24	CONUMA RIVER	5	19	4	15	0	0	5	20	0.000	1.000	24
25	COUS CREEK	12	45	5	18	1	2	11	45	0.083	1.000	25
26	COWICHAN RIVER COTTONWOOD,SKUTZ FAL	1555	6345	264	1072	65	267	878	3572	0.042	0.606	26
29	CYPRE RIVER	1	4	1	4	0	0	7	32	0.000	7.000	29
30	DAVIE RIVER	1	4	1	4	0	0	1	4	0.000	1.000	30
34	ENGLISHMAN RIVER	565	2260	127	514	63	259	353	1466	0.112	0.736	34
35	ESPINOSA CREEK	2	8	2	8	0	0	2	8	0.000	1.000	35
36	EVE RIVER	28	114	15	59	1	4	28	118	0.036	1.036	36
39	FRENCH CREEK	14	54	5	17	0	0	1	4	0.000	0.071	39
41	GOLD RIVER UCONA R.	710	2744	180	665	11	33	1547	5844	0.015	2.194	41
42	GOLDSTREAM RIVER	6	24	5	20	0	0	1	4	0.000	0.167	42
43	GOODSPEED RIVER	3	12	2	8	0	0	0	0	0.000	0.000	43
44	GORDON RIVER	13	56	7	28	2	8	28	124	0.154	2.308	44
45	HARRIS CREEK	59	243	28	115	0	0	41	168	0.000	0.695	45
47	HASLAM CREEK	3	12	1	4	0	0	3	12	0.000	1.000	47
48	HEBER RIVER	9	32	6	20	0	0	6	27	0.000	0.667	48
53	JACKLAH RIVER	3	12	1	4	0	0	5	20	0.000	1.667	53
54	JORDAN RIVER	2	8	1	4	0	0	0	0	0.000	0.000	54
55	KAIPIT CREEK	6	24	2	8	0	0	10	41	0.000	1.667	55
56	KAKWEIKEN RIVER	2	9	1	4	0	0	0	0	0.000	0.000	56
57	KAOUK RIVER ROWLAND CR.	13	53	3	12	0	0	10	41	0.000	0.769	57
59	KEOGH RIVER	401	1618	67	267	73	291	876	3434	0.182	2.367	59
60	KENNEDY RIVER	1	4	1	4	0	0	0	0	0.000	0.000	60
63	KITSUCKSUS CREEK	10	41	1	4	1	4	15	61	0.100	1.600	63
64	KLANAWA RIVER	9	36	2	8	0	0	16	65	0.000	1.778	64
67	KOKISH RIVER	16	63	9	34	1	4	24	98	0.063	1.563	67
68	KOKSILAH RIVER	33	135	11	45	0	0	8	32	0.000	0.242	68
69	KOOTOWIS CREEK INDIAN R.	16	65	2	8	0	0	17	69	0.000	1.063	69
71	LEINER RIVER	27	109	3	11	0	0	22	89	0.000	0.815	71
73	LITTLE QUALICUM RIVE	1034	4185	204	827	124	513	638	2567	0.120	0.737	73
74	LITTLE ZEBALLOS RIVE	4	16	3	12	0	0	10	42	0.000	2.500	74

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
75	MACJACK RIVER	1	4	1	4	0	0	0	0	0.000	0.000	75
78	MAGGIE RIVER DRAW CR.	6	24	1	4	0	0	0	0	0.000	0.000	78
79	MAHATTA RIVER	12	50	7	28	0	0	17	69	0.000	1.417	79
81	MARBLE RIVER AMAZON R.,LINK CR.	109	418	24	84	4	16	71	282	0.037	0.688	81
82	MEGIN RIVER	3	13	2	9	0	0	17	78	0.000	5.667	82
85	MILLSTREAM RIVER	6	24	1	4	1	4	8	32	0.167	1.500	85
86	MOHUN CREEK TROUT CR.	8	32	3	12	0	0	15	61	0.000	1.875	86
87	MOYEHA RIVER	2	8	2	8	0	0	8	32	0.000	4.000	87
88	MUCHALAT RIVER	2	8	1	4	0	0	1	4	0.000	0.500	88
89	MUIR CREEK	2	8	1	4	0	0	3	12	0.000	1.500	89
90	NAHMINT RIVER	30	124	13	54	0	0	64	263	0.000	2.133	90
91	NAHWITTI RIVER	24	96	12	48	0	0	52	213	0.000	2.167	91
92	NANAIMO RIVER	1010	4139	119	484	59	243	485	2003	0.058	0.539	92
94	NIMPKISH RIVER	127	521	40	158	0	0	130	539	0.000	1.024	94
95	NITINAT RIVER LITTLE NITINAT R.	21	87	12	50	0	0	7	28	0.000	0.333	95
97	OYSTER RIVER	326	1334	82	326	7	22	136	555	0.021	0.439	97
101	PUNTLEDGE RIVER COURTENAY R.	176	719	34	134	2	8	182	747	0.011	1.045	101
102	QUATSE RIVER	422	1758	65	266	52	216	375	1539	0.123	1.012	102
103	QUINSAM RIVER	960	3905	154	610	60	231	759	3082	0.063	0.853	103
107	SALMON RIVER BIGTREE CR.	105	407	42	156	0	0	102	418	0.000	0.971	107
109	SAN JUAN RIVER CLAPP,FLEET,GRANITE,	86	350	29	117	0	0	67	273	0.000	0.779	109
112	SARITA RIVER	24	99	13	54	0	0	29	119	0.000	1.208	112
115	SOMASS RIVER CHERRY CR.	586	2351	94	364	148	579	555	2163	0.253	1.200	115
117	SOOKE RIVER	81	333	20	82	8	32	7	28	0.099	0.185	117
118	SPROAT RIVER	475	1920	79	311	104	409	577	2314	0.219	1.434	118
120	STAMP RIVER	2052	8152	409	1573	377	1471	1703	6987	0.184	1.014	120
122	SUCWOA RIVER	9	36	2	8	0	0	8	32	0.000	0.889	122
123	TAHSIS RIVER	41	168	4	16	0	0	25	103	0.000	0.610	123
124	TAHSISH RIVER	3	12	3	12	0	0	4	16	0.000	1.333	124
125	TAYLOR RIVER	7	28	3	12	1	4	7	28	0.143	1.143	125
127	TOQUART RIVER	12	45	5	18	0	0	24	98	0.000	2.000	127
129	TRENT RIVER	29	124	9	37	0	0	9	38	0.000	0.310	129
130	TSABLE RIVER	3	12	2	8	0	0	1	4	0.000	0.333	130
132	TSOLUM RIVER	9	37	2	8	0	0	0	0	0.000	0.000	132
133	TSOWWIN RIVER	4	16	2	8	0	0	8	32	0.000	2.000	133
134	TSULQUATE RIVER	10	41	3	12	0	0	11	45	0.000	1.100	134
137	WAKEMAN RIVER	10	20	3	5	0	0	7	13	0.000	0.700	137
139	WANOKANO CREEK	2	8	2	8	0	0	1	4	0.000	0.500	139
140	WAUKWASS CREEK	45	185	20	82	0	0	71	293	0.000	1.578	140
141	WHITE RIVER	15	55	9	30	0	0	11	41	0.000	0.733	141
144	WOSS RIVER	13	53	7	28	1	4	13	55	0.077	1.077	144
145	ZEBALLOS RIVER	123	499	10	36	3	12	32	122	0.024	0.285	145
147	ESCALANTE RIVER	1	4	1	4	0	0	0	0	0.000	0.000	147
149	COEUR D'ALENE CREEK	6	27	1	4	2	9	16	73	0.333	3.000	149
150	VILLAGE BAY CREEK	5	20	1	4	1	4	0	0	0.200	0.200	150
151	CAMBELL/QUINSAM RIVE	1	4	1	4	0	0	1	4	0.000	1.000	151

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
153	STAMP/SOMASS	77	322	15	62	19	81	471	1951	0.247	6.364	153
155	MILLSTONE RIVER	2	8	1	4	0	0	1	4	0.000	0.500	155
156	OUOUKINSH RIVER	1	4	1	4	1	4	1	4	1.000	2.000	156
	AREA TOTALS:	13888	55695	2859	11179	1355	5386	12250	49113	0.098	0.980	

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Lower Mainland)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
165	ALOUETTE RIVER SOUTH ALOUETTE R.	2296	10555	240	1096	207	943	912	4209	0.090	0.487	165
167	ASHLU CREEK	22	101	6	27	2	9	58	267	0.091	2.727	167
168	BEAR RIVER	6	27	1	4	0	0	0	0	0.000	0.000	168
169	BERTRAM CREEK	6	27	3	13	0	0	0	0	0.000	0.000	169
170	BIG SILVER CREEK	4	18	3	13	1	4	2	9	0.250	0.750	170
171	BIRKENHEAD RIVER	13	60	4	18	0	0	1	4	0.000	0.077	171
172	BREM RIVER	4	17	3	13	0	0	5	21	0.000	1.250	172
173	BRITTAIN RIVER	1	4	1	4	0	0	0	0	0.000	0.000	173
174	BRUNETTE RIVER	24	110	8	36	0	0	12	55	0.000	0.500	174
175	CAPILANO RIVER BROTHERS CR.	548	2509	86	389	21	96	123	567	0.038	0.263	175
176	CHAPMAN CREEK	106	479	6	27	5	21	25	110	0.047	0.283	176
177	CHEAKAMUS RIVER CHEEKYE R.	591	2692	106	472	5	23	390	1790	0.008	0.668	177
178	CHEHALIS RIVER STATLU CR.	1672	7660	324	1477	186	847	770	3538	0.111	0.572	178
179	CHILLIWACK RIVER VEDDER R.	14909	67315	1437	6406	1223	5521	5729	26106	0.082	0.466	179
180	COGBURN CREEK	14	63	8	35	3	13	10	42	0.214	0.929	180
181	COQUIHALLA RIVER	332	1490	84	364	3	13	152	679	0.009	0.467	181
182	COQUITLAM RIVER	138	633	34	155	0	0	66	303	0.000	0.478	182
184	DAKOTA CREEK	36	166	3	13	0	0	4	18	0.000	0.111	184
186	ELAHO CREEK	4	18	3	13	0	0	0	0	0.000	0.000	186
188	FRASER RIVER	2599	11726	239	1053	74	334	268	1210	0.028	0.132	188
190	GRAY CREEK	8	36	2	9	0	0	1	4	0.000	0.125	190
191	HARRISON RIVER	21	96	9	41	0	0	1	4	0.000	0.048	191
196	INDIAN RIVER	2	9	2	9	0	0	1	4	0.000	0.500	196
197	KANAKA CREEK	137	632	17	78	9	41	53	244	0.066	0.453	197
199	LANG CREEK WOLFSOHN CR.	48	221	6	27	1	4	38	175	0.021	0.813	199
200	LANGDALE CREEK	6	27	1	4	0	0	0	0	0.000	0.000	200
201	LILLOOET RIVER	9	39	4	17	0	0	2	9	0.000	0.222	201
202	LITTLE CAMPBELL RIVE	541	2494	72	330	20	92	69	318	0.037	0.165	202

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Lower Mainland)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
205	LYNN CREEK	50	216	9	37	0	0	6	21	0.000	0.120	205
206	MCNAB CREEK	6	27	2	9	0	0	3	13	0.000	0.500	206
207	MAMQUAM RIVER	67	309	10	46	0	0	40	184	0.000	0.597	207
211	NAHATLATCH RIVER	24	97	9	36	0	0	18	67	0.000	0.750	211
212	NATHAN CREEK BEAVER CR.	5	23	1	4	0	0	0	0	0.000	0.000	212
213	NICOMEKL RIVER	200	923	29	133	2	9	17	78	0.010	0.095	213
214	NICOMEN SLOUGH DEWDNEY SLOUGH	2	9	1	4	0	0	0	0	0.000	0.000	214
215	NORRISH CREEK SUICIDE CR.	7	31	6	27	1	4	0	0	0.143	0.143	215
216	NORTH ALOUETTE RIVER	162	747	13	60	2	9	35	161	0.012	0.228	216
217	ORFORD RIVER	1	4	1	4	0	0	1	4	0.000	1.000	217
218	PHILLIPS RIVER	1	4	1	4	0	0	3	12	0.000	3.000	218
219	PITT RIVER	21	96	3	13	0	0	26	120	0.000	1.238	219
221	QUATAM RIVER	2	6	1	3	0	0	0	0	0.000	0.000	221
222	RAINY RIVER	38	170	5	22	0	0	6	25	0.000	0.158	222
223	ROBERTS CREEK	41	189	4	18	1	4	12	55	0.024	0.317	223
225	SALMON RIVER	57	263	8	36	0	0	7	32	0.000	0.123	225
226	SECHELT CREEK	1	4	1	4	0	0	0	0	0.000	0.000	226
227	SERPENTINE RIVER	17	78	4	18	1	4	1	4	0.059	0.118	227
228	SEYMOUR RIVER	1026	4591	154	690	43	179	309	1407	0.042	0.343	228
229	SILVERDALE CREEK	8	36	1	4	1	4	2	9	0.125	0.375	229
230	SILVERHOPE CREEK SILVER CR.	127	584	24	109	0	0	68	310	0.000	0.535	230
235	SQUAMISH RIVER	511	2288	150	660	9	41	287	1287	0.018	0.579	235
236	STAVE RIVER	46	212	11	50	1	4	6	27	0.022	0.152	236
238	SUMAS RIVER	90	396	9	32	3	10	17	76	0.033	0.222	238
243	TZOONIE RIVER	2	9	1	4	0	0	0	0	0.000	0.000	243
246	WEAVER CREEK	11	49	8	35	0	0	4	18	0.000	0.364	246
248	WHONOCK CREEK	4	18	2	9	0	0	4	18	0.000	1.000	248
249	WIDGEON CREEK	2	9	1	4	0	0	0	0	0.000	0.000	249
250	WILSON CREEK	4	18	2	9	0	0	0	0	0.000	0.000	250
253	MACNAIR CREEK	5	23	1	4	0	0	2	9	0.000	0.400	253
254	POTLATCH CREEK	13	29	3	8	0	0	13	29	0.000	1.000	254
	AREA TOTALS:	26648	120682	3187	14239	1824	8229	9579	43652	0.068	0.428	

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Thompson-Nicola)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
273	CAYOOSH RIVER	51	178	3	11	0	0	4	18	0.000	0.078	273
274	DEADMAN RIVER	4	12	1	3	0	0	0	0	0.000	0.000	274
275	NICOLA RIVER	10	35	5	17	0	0	5	19	0.000	0.500	275
277	STEIN RIVER	1	4	1	4	0	0	1	4	0.000	1.000	277
278	THOMPSON RIVER	1800	6249	382	1357	10	35	1226	4161	0.006	0.687	278
279	COLDWATER RIVER	1	2	1	2	0	0	0	0	0.000	0.000	279
	AREA TOTALS:	1867	6480	393	1394	10	35	1236	4202	0.005	0.667	

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Cariboo)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
300	ATNARKO RIVER	280	851	71	211	44	138	171	454	0.157	0.768	300
301	BELLA COOLA RIVER SNOOTLI CR.	1384	4392	248	771	210	645	815	2337	0.152	0.741	301
303	CHILCOTIN RIVER ALEXIS CR,CHILANKO R	91	311	32	105	5	17	98	344	0.055	1.132	303
304	CHILKO RIVER	2	6	1	3	0	0	2	6	0.000	1.000	304
305	CHUCKWALLA RIVER	100	254	29	69	36	89	160	439	0.360	1.960	305
306	CLYAK RIVER	3	13	1	4	0	0	1	4	0.000	0.333	306
307	DEAN RIVER	2023	5256	357	942	176	526	2889	7310	0.087	1.515	307
308	KILBELLA RIVER	40	127	13	32	12	38	77	271	0.300	2.225	308
309	KIMSQUIT RIVER	3	8	3	9	0	0	10	36	0.000	3.333	309
311	KWATNA RIVER	7	16	2	5	0	0	0	0	0.000	0.000	311
312	MACHMELL RIVER	3	12	1	4	0	0	0	0	0.000	0.000	312
313	NEKITE RIVER	12	49	4	15	1	4	14	63	0.083	1.250	313
314	NOEICK RIVER	4	18	1	4	0	0	1	4	0.000	0.250	314
316	QUESNEL RIVER	1	3	1	3	0	0	0	0	0.000	0.000	316
317	SALLOOMT RIVER	5	18	3	9	0	0	1	4	0.000	0.200	317
319	TALCHAKO RIVER	2	8	2	8	0	0	0	0	0.000	0.000	319
320	TALEOMEY RIVER	1	3	1	3	0	0	0	0	0.000	0.000	320
321	TASEKO RIVER	1	2	1	2	0	0	0	0	0.000	0.000	321
	AREA TOTALS:	3962	11347	771	2199	484	1457	4239	11272	0.122	1.192	

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Skeena)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
325	BABINE RIVER	1224	3324	226	607	59	177	2107	5292	0.048	1.770	325
328	BISH CREEK	4	16	3	12	2	8	0	0	0.500	0.500	328
329	BULKLEY RIVER BOULDER,CHICKEN,TOBO	4487	15631	705	2290	425	1518	2785	9369	0.095	0.715	329
330	BULKLEY/MORICE RIVER	91	278	7	19	6	23	104	358	0.066	1.209	330
331	CANOONA RIVER INDIAN R.	6	18	5	14	0	0	8	26	0.000	1.333	331
332	CEDAR CREEK	18	69	8	29	1	4	20	60	0.056	1.167	332
333	CLORE RIVER	45	159	12	36	2	6	31	102	0.044	0.733	333
334	CRANBERRY RIVER	466	1523	125	411	83	250	227	798	0.178	0.665	334
335	DALA RIVER	1	4	1	4	0	0	0	0	0.000	0.000	335
336	DAMDOCHAX CREEK BLACKWATER R.	71	170	13	31	1	4	211	458	0.014	2.986	336
337	ECSTALL RIVER FALLS R.	4	17	2	8	0	0	0	0	0.000	0.000	337
339	EXCHAMSIKS RIVER	14	46	6	17	2	7	8	33	0.143	0.714	339
340	EXSTEW RIVER	23	92	3	9	2	8	9	37	0.087	0.478	340
342	GITNADOIX RIVER	15	46	6	19	3	10	3	12	0.200	0.400	342
344	INKLIN RIVER	5	20	2	8	0	0	5	20	0.000	1.000	344
345	ISHKEENICKH RIVER	102	392	29	109	18	72	127	487	0.176	1.422	345
347	KASIKS RIVER	9	33	5	19	0	0	0	0	0.000	0.000	347
348	KEMANO RIVER	4	16	2	8	2	8	1	4	0.500	0.750	348
350	KHYEX RIVER	5	20	4	16	1	4	8	33	0.200	1.800	350
351	KILDALA RIVER	1	4	1	4	1	4	0	0	1.000	1.000	351
354	KISPIOX RIVER SWEETIN R.	1247	3401	246	684	50	139	1206	3298	0.040	1.007	354
355	KITEEN RIVER	98	348	39	143	27	107	66	261	0.276	0.949	355
356	KITIMAT RIVER HIRSCH,LITTLE WEDEEN	1398	5587	201	764	167	679	414	1682	0.119	0.416	356
357	KITLOPE RIVER	10	41	1	4	0	0	9	37	0.000	0.900	357
358	KITSEQUECLA RIVER	9	31	3	10	4	14	2	7	0.444	0.667	358
360	KITSUMKALUM RIVER BEAVER R.,KALUM R.	1170	4621	236	903	118	474	558	2255	0.101	0.578	360
362	KITWANGA RIVER	5	14	5	14	0	0	0	0	0.000	0.000	362
363	KLEANZA CREEK	12	45	2	6	0	0	0	0	0.000	0.000	363
364	KLOIYA RIVER	288	1190	25	102	10	41	114	470	0.035	0.431	364
365	KLUATANTAN RIVER	23	74	3	10	0	0	23	79	0.000	1.000	365
369	KWINAMASS RIVER	26	100	11	43	6	21	65	265	0.231	2.731	369
371	LAKELSE RIVER COLDWATER,WILLIAMS C	925	3318	158	549	45	164	432	1661	0.049	0.516	371
372	MEZIADIN RIVER	51	204	10	37	2	8	6	24	0.039	0.157	372
373	MORICE RIVER	2085	7191	339	1101	191	710	1423	4642	0.092	0.774	373
376	NAKINA RIVER	62	155	13	30	19	46	82	213	0.306	1.629	376
377	NANIKA RIVER	6	20	2	6	2	4	6	12	0.333	1.333	377
378	NASS RIVER	166	505	51	156	25	81	138	397	0.151	0.982	378
385	SKEENA RIVER BOULDER,FIDDLER,KWIN	6469	21006	892	2785	884	2741	2469	7932	0.137	0.518	385
386	STIKINE RIVER	21	70	11	33	1	2	7	20	0.048	0.381	386
387	SUSKWA RIVER BEAR R.	66	224	21	69	0	0	86	282	0.000	1.303	387
388	SUSTUT RIVER BEAR R.	301	796	59	159	44	109	218	556	0.146	0.870	388
390	TAHLTAN RIVER	54	204	16	56	18	66	21	68	0.333	0.722	390
391	TAKU RIVER	9	17	2	3	2	3	3	5	0.222	0.556	391

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Skeena)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
392	TATSAMENIE RIVER TATSATUA R.	25	47	4	7	1	1	1	1	0.040	0.080	392
394	TELKWA RIVER	59	222	16	55	4	15	8	33	0.068	0.203	394
395	TSEAX RIVER	195	668	71	241	32	116	156	599	0.164	0.964	395
396	TUYA RIVER	4	13	1	3	0	0	15	48	0.000	3.750	396
397	WEEWANIE CREEK	1	4	1	4	0	0	2	8	0.000	2.000	397
399	ZYMAGOTITZ RIVER ZIMACOR R.	8	33	4	16	3	12	6	24	0.375	1.125	399
400	ZYMOETZ RIVER COPPER R.	1527	5461	247	847	142	545	1073	3665	0.093	0.796	400
401	ENSHESHESE RIVER	1	4	1	4	0	0	1	4	0.000	1.000	401
402	KHUTZE RIVER	5	10	3	6	0	0	1	2	0.000	0.200	402
403	KINCOLITH RIVER	1	4	1	4	1	4	0	0	1.000	1.000	403
404	CHAMBERS CREEK	1	4	1	4	1	4	0	0	1.000	1.000	404
	AREA TOTALS:	22923	77510	3862	12531	2407	8209	14265	45639	0.105	0.727	

Appendix 4 - ANGLER DAYS AND CATCH SUCCESS, 1986-87 (Queen Charlotte Islands)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	KEPT REP	KEPT EST	RELEASED REP	RELEASED EST	KEPT/DAY	CATCH/DAY	STR#
425	AIN RIVER	5	20	3	12	0	0	1	4	0.000	0.200	425
429	COPPER CREEK	169	674	31	117	21	80	182	733	0.124	1.201	429
430	DATLAMEN CREEK	6	24	2	8	0	0	15	62	0.000	2.500	430
432	DEENA CREEK	67	270	21	81	7	28	77	319	0.104	1.254	432
434	HIELLEN RIVER	33	134	6	23	2	8	23	95	0.061	0.758	434
435	HONNA RIVER	131	542	26	106	26	108	67	278	0.198	0.710	435
436	MAMIN RIVER	107	433	24	91	19	73	145	577	0.178	1.533	436
437	MATHERS CREEK	7	28	2	8	0	0	2	8	0.000	0.286	437
438	NADEN RIVER	6	27	1	4	1	4	2	9	0.167	0.500	438
439	PALLANT CREEK MORESBY L.,MOSQUITO	57	219	19	70	6	17	88	350	0.105	1.649	439
441	SANGAN RIVER	5	20	1	4	0	0	0	0	0.000	0.000	441
442	SKEDANS CREEK	20	82	2	8	1	4	12	49	0.050	0.650	442
445	TLELL RIVER	99	396	30	117	28	113	71	263	0.283	1.000	445
446	YAKOUN RIVER	991	4003	157	618	193	768	1593	6474	0.195	1.802	446
447	HAANS CREEK	5	20	2	8	0	0	12	49	0.000	2.400	447
449	LAGINS CREEK	1	4	1	4	0	0	0	0	0.000	0.000	449
450	SLATECHUCK CREEK	1	4	1	4	0	0	0	0	0.000	0.000	450
	AREA TOTALS:	1710	6900	329	1283	304	1203	2290	9270	0.178	1.517	
555	UNKNOWN STREAMS	303	891	115	374	43	105	100	244	0.142	0.472	555
	TOTAL FOR ALL AREAS:	71301	279505	11516	43199	6427	24624	43959	163392	0.090	0.707	

Anglers who did not report no. of days fished are not included in this report.

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
1	ADAM RIVER	21	84	7	26	0	0	53	231	1	5	1	5	1
3	AMOR DE COSMOS RIVER	34	131	16	60	0	0	64	215	2	8	11	39	3
	BEAR R.													
6	ASH RIVER	44	177	19	76	0	0	21	85	13	54	11	45	6
9	BENSON RIVER	2	8	1	4	0	0	2	8	0	0	0	0	9
10	BIG QUALICUM RIVER	931	3645	202	812	0	0	237	938	96	385	264	1018	10
	QUALICUM R.													
11	BLACK CREEK	5	21	2	8	0	0	0	0	0	0	0	0	11
13	BROWNS RIVER	2	6	2	6	0	0	2	8	0	0	1	4	13
14	BURMAN RIVER	26	101	7	23	0	0	69	276	1	4	0	0	14
15	CAMPBELL RIVER	884	3380	198	693	1	2	263	1035	35	147	275	1110	15
16	CAYCUSE RIVER	35	146	7	29	0	0	38	160	0	0	0	0	16
17	CAYEGHLE CREEK	19	78	5	21	0	0	5	21	0	0	0	0	17
18	CHASE RIVER	5	21	1	4	0	0	4	16	0	0	0	0	18
19	CHEMAINUS RIVER	59	243	16	66	0	0	17	70	0	0	0	0	19
20	CHINA CREEK	63	262	13	55	6	25	94	390	1	4	9	37	20
21	CLUXEWE RIVER	100	402	28	110	0	0	118	463	7	27	28	114	21
22	COLEMAN CREEK	3	12	1	4	0	0	3	12	0	0	0	0	22
23	COLONIAL CREEK	8	33	3	12	0	0	5	21	0	0	0	0	23
24	CONUMA RIVER	5	20	4	16	0	0	5	21	0	0	0	0	24
25	COUS CREEK	12	45	5	19	1	2	11	45	0	0	0	0	25
26	COWICHAN RIVER	1555	6348	264	1073	2	8	702	2859	63	260	176	717	26
	COTTONWOOD,SKUTZ FAL													
29	CYPRE RIVER	1	5	1	5	0	0	7	32	0	0	0	0	29
30	DAVIE RIVER	1	4	1	4	0	0	1	4	0	0	0	0	30
34	ENGLISHMAN RIVER	565	2265	127	517	1	4	228	944	62	257	125	525	34
35	ESPINOSA CREEK	2	8	2	8	0	0	2	8	0	0	0	0	35
36	EVE RIVER	28	115	15	60	0	0	27	115	1	5	1	4	36
39	FRENCH CREEK	14	55	5	18	0	0	1	4	0	0	0	0	39
41	GOLD RIVER	710	2749	180	669	2	8	1475	5568	9	27	72	280	41
	UCONA R.													
42	GOLDSTREAM RIVER	6	25	5	21	0	0	1	4	0	0	0	0	42
43	GOODSPEED RIVER	3	12	2	8	0	0	0	0	0	0	0	0	43
44	GORDON RIVER	13	57	7	29	0	0	26	118	2	8	2	8	44
45	HARRIS CREEK	59	244	28	116	0	0	41	169	0	0	0	0	45
47	HASLAM CREEK	3	12	1	4	0	0	3	12	0	0	0	0	47
48	HEBER RIVER	9	34	6	22	0	0	6	27	0	0	0	0	48
53	JACKLAH RIVER	3	12	1	4	0	0	5	21	0	0	0	0	53
54	JORDAN RIVER	2	8	1	4	0	0	0	0	0	0	0	0	54
55	KAIPIT CREEK	6	25	2	8	0	0	10	41	0	0	0	0	55
56	KAKWEIKEN RIVER	2	9	1	5	0	0	0	0	0	0	0	0	56
57	KAOUK RIVER	13	54	3	12	0	0	10	41	0	0	0	0	57
	ROWLAND CR.													
59	KEOGH RIVER	401	1621	67	270	0	0	400	1572	73	293	476	1865	59
60	KENNEDY RIVER	1	4	1	4	0	0	0	0	0	0	0	0	60
63	KITSUCKSUS CREEK	10	41	1	4	0	0	15	62	1	4	0	0	63
64	KLANAWA RIVER	9	38	2	9	0	0	16	66	0	0	0	0	64
67	KOKISH RIVER	16	64	9	35	0	0	24	99	1	4	0	0	67
68	KOKSILAH RIVER	33	136	11	45	0	0	8	33	0	0	0	0	68

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
69	KOOTOWIS CREEK	16	66	2	8	0	0	17	70	0	0	0	0	69
	INDIAN R.													
71	LEINER RIVER	27	110	3	11	0	0	22	90	0	0	0	0	71
73	LITTLE QUALICUM RIVE	1034	4188	204	829	1	4	375	1520	123	511	263	1050	73
74	LITTLE ZEBALLOS RIVE	4	17	3	13	0	0	10	43	0	0	0	0	74
75	MACJACK RIVER	1	4	1	4	0	0	0	0	0	0	0	0	75
78	MAGGIE RIVER	6	25	1	4	0	0	0	0	0	0	0	0	78
	DRAW CR.													
79	MAHATTA RIVER	12	52	7	29	0	0	17	70	0	0	0	0	79
81	MARBLE RIVER	109	421	24	87	4	16	70	281	0	0	1	3	81
	AMAZON R.,LINK CR.													
82	MEGIN RIVER	3	14	2	9	0	0	17	78	0	0	0	0	82
85	MILLSTREAM RIVER	6	25	1	4	0	0	8	33	1	4	0	0	85
86	MOHUN CREEK	8	33	3	12	0	0	11	45	0	0	4	16	86
	TROUT CR.													
87	MOYEHA RIVER	2	8	2	8	0	0	8	33	0	0	0	0	87
88	MUCHALAT RIVER	2	8	1	4	0	0	1	4	0	0	0	0	88
89	MUIR CREEK	2	8	1	4	0	0	3	12	0	0	0	0	89
90	NAHMINT RIVER	30	125	13	55	0	0	64	264	0	0	0	0	90
91	NAHWITTI RIVER	24	97	12	49	0	0	52	216	0	0	0	0	91
92	NANAIMO RIVER	1010	4142	119	484	7	29	323	1334	52	215	162	669	92
94	NIMPKISH RIVER	127	522	40	161	0	0	128	533	0	0	2	8	94
95	NITINAT RIVER	21	87	12	50	0	0	7	29	0	0	0	0	95
	LITTLE NITINAT R.													
97	OYSTER RIVER	326	1337	82	328	1	2	100	410	6	21	36	147	97
101	PUNTLEDGE RIVER	176	721	34	136	0	0	111	457	2	8	71	290	101
	COURTENAY R.													
102	QUATSE RIVER	422	1759	65	269	1	4	85	346	51	213	290	1195	102
103	QUINSAM RIVER	960	3909	154	612	0	0	457	1862	60	234	302	1222	103
107	SALMON RIVER	105	409	42	157	0	0	98	402	0	0	4	18	107
	BIGTREE CR.													
109	SAN JUAN RIVER	86	352	29	118	0	0	67	274	0	0	0	0	109
	CLAPP,FLEET,GRANITE,													
112	SARITA RIVER	24	100	13	55	0	0	29	120	0	0	0	0	112
115	SOMASS RIVER	586	2353	94	367	1	2	142	556	147	579	413	1609	115
	CHERRY CR.													
117	SOOKE RIVER	81	333	20	82	0	0	5	21	8	33	2	8	117
118	SPROAT RIVER	475	1922	79	314	6	17	146	587	98	394	431	1729	118
120	STAMP RIVER	2052	8156	409	1577	15	37	757	3100	362	1439	946	3890	120
122	SUCWOA RIVER	9	37	2	8	0	0	8	33	0	0	0	0	122
123	TAHSIS RIVER	41	169	4	16	0	0	25	103	0	0	0	0	123
124	TAHSISH RIVER	3	12	3	12	0	0	4	16	0	0	0	0	124
125	TAYLOR RIVER	7	29	3	12	0	0	5	21	1	4	2	8	125
127	TOQUART RIVER	12	45	5	19	0	0	24	99	0	0	0	0	127
129	TRENT RIVER	29	125	9	38	0	0	9	39	0	0	0	0	129
130	TSABLE RIVER	3	12	2	8	0	0	1	4	0	0	0	0	130
132	TSOLUM RIVER	9	37	2	8	0	0	0	0	0	0	0	0	132
133	TSOWWIN RIVER	4	17	2	8	0	0	8	33	0	0	0	0	133
134	TSULQUATE RIVER	10	41	3	12	0	0	11	45	0	0	0	0	134
137	WAKEMAN RIVER	10	21	3	6	0	0	7	14	0	0	0	0	137

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Vancouver Island)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
139	WANOKANO CREEK	2	8	2	8	0	0	1	4	0	0	0	0	139
140	WAUKWASS CREEK	45	186	20	83	0	0	67	278	0	0	4	16	140
141	WHITE RIVER	15	56	9	31	0	0	11	41	0	0	0	0	141
144	WOSS RIVER	13	54	7	29	0	0	13	56	1	4	0	0	144
145	ZEBALLOS RIVER	123	501	10	37	0	0	32	123	3	12	0	0	145
147	ESCALANTE RIVER	1	4	1	4	0	0	0	0	0	0	0	0	147
149	COEUR D'ALENE CREEK	6	28	1	5	0	0	4	18	2	9	12	55	149
150	VILLAGE BAY CREEK	5	21	1	4	1	4	0	0	0	0	0	0	150
151	CAMBELL/QUINSAM RIVE	1	4	1	4	0	0	1	4	0	0	0	0	151
153	STAMP/SOMASS	77	323	15	64	0	0	13	58	19	82	458	1894	153
155	MILLSTONE RIVER	2	8	1	4	0	0	1	4	0	0	0	0	155
156	OUOUKINSH RIVER	1	4	1	4	1	4	1	4	0	0	0	0	156
	AREA TOTALS:	13888	55806	2859	11262	51	168	7395	29602	1304	5254	4855	19598	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Lower Mainland)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
165	ALOUETTE RIVER SOUTH ALOUETTE R.	2296	10557	240	1098	12	55	426	1966	195	890	486	2244	165
167	ASHLU CREEK	22	102	6	28	0	0	56	259	2	9	2	9	167
168	BEAR RIVER	6	28	1	5	0	0	0	0	0	0	0	0	168
169	BERTRAM CREEK	6	28	3	14	0	0	0	0	0	0	0	0	169
170	BIG SILVER CREEK	4	18	3	14	1	5	0	0	0	0	2	9	170
171	BIRKENHEAD RIVER	13	60	4	18	0	0	1	5	0	0	0	0	171
172	BREM RIVER	4	17	3	13	0	0	5	22	0	0	0	0	172
173	BRITTAIN RIVER	1	5	1	5	0	0	0	0	0	0	0	0	173
174	BRUNETTE RIVER	24	111	8	37	0	0	4	18	0	0	8	37	174
175	CAPILANO RIVER BROTHERS CR.	548	2511	86	391	0	0	80	369	21	96	43	199	175
176	CHAPMAN CREEK	106	480	6	27	0	0	25	111	5	22	0	0	176
177	CHEAKAMUS RIVER CHEEKYE R.	591	2694	106	473	0	0	376	1727	5	23	14	65	177
178	CHEHALIS RIVER STATLU CR.	1672	7664	324	1481	0	0	273	1247	186	849	497	2294	178
179	CHILLIWACK RIVER VEDDER R.	14909	67319	1437	6412	24	103	3448	15704	1199	5423	2281	10406	179
180	COGBURN CREEK	14	63	8	36	0	0	6	27	3	14	4	17	180

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
181	COQUIHALLA RIVER	332	1493	84	368	0	0	122	548	3	14	30	134	181
182	COQUITLAM RIVER	138	635	34	156	0	0	63	290	0	0	3	14	182
184	DAKOTA CREEK	36	166	3	14	0	0	4	18	0	0	0	0	184
186	ELAHO CREEK	4	18	3	14	0	0	0	0	0	0	0	0	186
188	FRASER RIVER	2599	11730	239	1057	63	285	247	1115	11	49	21	97	188
190	GRAY CREEK	8	37	2	9	0	0	1	5	0	0	0	0	190
191	HARRISON RIVER	21	97	9	42	0	0	1	5	0	0	0	0	191
196	INDIAN RIVER	2	9	2	9	0	0	1	5	0	0	0	0	196
197	KANAKA CREEK	137	633	17	78	2	9	38	175	7	32	15	69	197
199	LANG CREEK WOLFSOHN CR.	48	221	6	27	0	0	38	175	1	5	0	0	199
200	LANGDALE CREEK	6	28	1	5	0	0	0	0	0	0	0	0	200
201	LILLOOET RIVER	9	40	4	18	0	0	2	9	0	0	0	0	201
202	LITTLE CAMPBELL RIVE	541	2495	72	330	1	5	52	240	19	88	17	78	202
205	LYNN CREEK	50	217	9	39	0	0	4	13	0	0	2	9	205
206	MCNAB CREEK	6	28	2	9	0	0	3	14	0	0	0	0	206
207	MAMQUAM RIVER	67	309	10	46	0	0	40	185	0	0	0	0	207
211	NAHATLATCH RIVER	24	99	9	37	0	0	18	69	0	0	0	0	211
212	NATHAN CREEK BEAVER CR.	5	23	1	5	0	0	0	0	0	0	0	0	212
213	NICOMEKL RIVER	200	923	29	134	0	0	14	65	2	9	3	14	213
214	NICOMEN SLOUGH DEWDNEY SLOUGH	2	9	1	5	0	0	0	0	0	0	0	0	214
215	NORRISH CREEK SUICIDE CR.	7	32	6	27	0	0	0	0	1	5	0	0	215
216	NORTH ALOUETTE RIVER	162	748	13	60	0	0	32	148	2	9	3	14	216
217	ORFORD RIVER	1	4	1	4	0	0	1	4	0	0	0	0	217
218	PHILLIPS RIVER	1	4	1	4	0	0	3	12	0	0	0	0	218
219	PITT RIVER	21	97	3	14	0	0	26	120	0	0	0	0	219
221	QUATAM RIVER	2	7	1	3	0	0	0	0	0	0	0	0	221
222	RAINY RIVER	38	171	5	23	0	0	6	26	0	0	0	0	222
223	ROBERTS CREEK	41	189	4	18	0	0	11	51	1	5	1	5	223
225	SALMON RIVER	57	263	8	37	0	0	7	32	0	0	0	0	225
226	SECHELT CREEK	1	5	1	5	0	0	0	0	0	0	0	0	226
227	SERPENTINE RIVER	17	78	4	18	0	0	1	5	1	5	0	0	227
228	SEYMOUR RIVER	1026	4594	154	692	0	0	240	1097	43	181	69	312	228
229	SILVERDALE CREEK	8	37	1	5	0	0	2	9	1	5	0	0	229
230	SILVERHOPE CREEK SILVER CR.	127	585	24	110	0	0	51	233	0	0	17	78	230
235	SQUAMISH RIVER	511	2291	150	662	6	28	275	1233	3	14	12	55	235
236	STAVE RIVER	46	212	11	51	0	0	4	18	1	5	2	9	236
238	SUMAS RIVER	90	398	9	33	0	0	16	73	3	11	1	4	238
243	TZOONIE RIVER	2	9	1	5	0	0	0	0	0	0	0	0	243
246	WEAVER CREEK	11	50	8	36	0	0	3	14	0	0	1	5	246
248	WHONOCK CREEK	4	18	2	9	0	0	4	18	0	0	0	0	248
249	WIDGEON CREEK	2	9	1	5	0	0	0	0	0	0	0	0	249
250	WILSON CREEK	4	18	2	9	0	0	0	0	0	0	0	0	250
253	MACNAIR CREEK	5	23	1	5	0	0	2	9	0	0	0	0	253
254	POTLATCH CREEK	13	30	3	9	0	0	13	30	0	0	0	0	254
	AREA TOTALS:	26648	120739	3187	14298	109	490	6045	27518	1715	7763	3534	16177	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Thompson-Nicola)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
273	CAYOOSH RIVER	51	179	3	12	0	0	4	18	0	0	0	0	273
274	DEADMAN RIVER	4	13	1	3	0	0	0	0	0	0	0	0	274
275	NICOLA RIVER	10	37	5	18	0	0	5	20	0	0	0	0	275
277	STEIN RIVER	1	4	1	4	0	0	1	4	0	0	0	0	277
278	THOMPSON RIVER	1800	6255	382	1362	9	32	1185	4038	1	5	41	129	278
279	COLDWATER RIVER	1	2	1	2	0	0	0	0	0	0	0	0	279
	AREA TOTALS:	1867	6490	393	1401	9	32	1195	4080	1	5	41	129	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Cariboo)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
300	ATNARKO RIVER	280	856	71	216	43	138	164	440	1	3	7	17	300
301	BELLA COOLA RIVER SNOOTLI CR.	1384	4398	248	777	201	625	802	2311	9	26	13	33	301
303	CHILCOTIN RIVER ALEXIS CR,CHILANKO R	91	314	32	108	5	17	98	346	0	0	0	0	303
304	CHILKO RIVER	2	7	1	3	0	0	2	7	0	0	0	0	304
305	CHUCKWALLA RIVER	100	256	29	71	36	90	160	441	0	0	0	0	305
306	CLYAK RIVER	3	14	1	5	0	0	1	5	0	0	0	0	306
307	DEAN RIVER	2023	5261	357	947	174	525	2878	7285	2	5	11	30	307
308	KILBELLA RIVER	40	128	13	33	12	38	77	272	0	0	0	0	308
309	KIMSQUIT RIVER	3	9	3	10	0	0	10	37	0	0	0	0	309
311	KWATNA RIVER	7	18	2	6	0	0	0	0	0	0	0	0	311
312	MACHMELL RIVER	3	12	1	4	0	0	0	0	0	0	0	0	312
313	NEKITE RIVER	12	50	4	16	1	5	14	63	0	0	0	0	313
314	NOEICK RIVER	4	18	1	5	0	0	1	5	0	0	0	0	314
316	QUESNEL RIVER	1	3	1	3	0	0	0	0	0	0	0	0	316
317	SALLOOMT RIVER	5	19	3	10	0	0	1	5	0	0	0	0	317
319	TALCHAKO RIVER	2	9	2	9	0	0	0	0	0	0	0	0	319
320	TALEOMEY RIVER	1	3	1	3	0	0	0	0	0	0	0	0	320
321	TASEKO RIVER	1	2	1	2	0	0	0	0	0	0	0	0	321
	AREA TOTALS:	3962	11377	771	2228	472	1438	4208	11217	12	34	31	80	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Skeena)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT. REP	WILD KEPT. EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
325	BABINE RIVER	1224	3327	226	612	55	171	2093	5261	4	10	14	35	325
328	BISH CREEK	4	17	3	12	2	8	0	0	0	0	0	0	328
329	BULKLEY RIVER BOULDER,CHICKEN,TOBO	4487	15635	705	2296	421	1514	2723	9208	4	9	62	166	329
330	BULKLEY/MORICE RIVER	91	280	7	21	6	24	104	359	0	0	0	0	330
331	CANOONA RIVER INDIAN R.	6	19	5	15	0	0	8	27	0	0	0	0	331
332	CEDAR CREEK	18	71	8	31	1	4	20	61	0	0	0	0	332
333	CLORE RIVER	45	161	12	38	2	6	30	101	0	0	1	2	333
334	CRANBERRY RIVER	466	1528	125	415	81	250	224	790	2	4	3	12	334
335	DALA RIVER	1	4	1	4	0	0	0	0	0	0	0	0	335
336	DAMDOCHAX CREEK BLACKWATER R.	71	172	13	32	1	4	211	459	0	0	0	0	336
337	ECSTALL RIVER FALLS R.	4	18	2	9	0	0	0	0	0	0	0	0	337
339	EXCHAMSIKS RIVER	14	47	6	18	2	7	8	33	0	0	0	0	339
340	EXSTEW RIVER	23	93	3	10	2	8	9	37	0	0	0	0	340
342	GITNADOIX RIVER	15	49	6	20	3	11	3	12	0	0	0	0	342
344	INKLIN RIVER	5	21	2	8	0	0	5	21	0	0	0	0	344
345	ISHKEENICKH RIVER	102	394	29	111	18	73	127	489	0	0	0	0	345
347	KASIKS RIVER	9	35	5	20	0	0	0	0	0	0	0	0	347
348	KEMANO RIVER	4	17	2	8	2	8	1	4	0	0	0	0	348
350	KHYEX RIVER	5	21	4	17	1	4	8	33	0	0	0	0	350
351	KILDALA RIVER	1	4	1	4	1	4	0	0	0	0	0	0	351
354	KISPIOX RIVER SWEETIN R.	1247	3408	246	691	48	138	1186	3258	2	4	20	45	354
355	KITEEN RIVER	98	352	39	146	27	109	65	259	0	0	1	4	355
356	KITIMAT RIVER HIRSCH,LITTLE WEDEEN	1398	5591	201	769	160	652	391	1593	7	29	23	93	356
357	KITLOPE RIVER	10	41	1	4	0	0	9	37	0	0	0	0	357
358	KITSEQUECLA RIVER	9	33	3	11	4	15	2	7	0	0	0	0	358
360	KITSUMKALUM RIVER BEAVER R.,KALUM R.	1170	4625	236	908	118	478	555	2247	0	0	3	10	360
362	KITWANGA RIVER	5	16	5	16	0	0	0	0	0	0	0	0	362
363	KLEANZA CREEK	12	46	2	6	0	0	0	0	0	0	0	0	363
364	KLOIYA RIVER	288	1191	25	103	8	33	114	471	2	8	0	0	364
365	KLUATANTAN RIVER	23	75	3	11	0	0	23	79	0	0	0	0	365
369	KWINAMASS RIVER	26	101	11	44	6	22	65	266	0	0	0	0	369
371	LAKELSE RIVER COLDWATER,WILLIAMS C	925	3323	158	554	43	161	425	1636	2	6	7	28	371
372	MEZIADIN RIVER	51	206	10	38	2	8	6	25	0	0	0	0	372
373	MORICE RIVER	2085	7196	339	1105	187	696	1380	4519	4	17	43	128	373
376	NAKINA RIVER	62	157	13	31	19	49	82	215	0	0	0	0	376
377	NANIKA RIVER	6	21	2	6	2	4	6	13	0	0	0	0	377
378	NASS RIVER	166	507	51	158	24	82	136	395	1	2	2	4	378
385	SKEENA RIVER BOULDER,FIDDLER,KWIN	6469	21010	892	2790	869	2708	2408	7766	15	39	61	170	385
386	STIKINE RIVER	21	72	11	35	1	2	7	21	0	0	0	0	386
387	SUSKWA RIVER	66	227	21	72	0	0	86	284	0	0	0	0	387

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY., 1986-87 (Skeena)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
	BEAR R.													
388	SUSTUT RIVER	301	801	59	162	42	108	217	557	2	4	1	2	388
	BEAR R.													
390	TAHLTAN RIVER	54	205	16	58	18	69	21	70	0	0	0	0	390
391	TAKU RIVER	9	18	2	4	2	4	3	6	0	0	0	0	391
392	TATSAMENIE RIVER	25	47	4	8	1	2	1	2	0	0	0	0	392
	TATSATUA R.													
394	TELKWA RIVER	59	225	16	57	4	16	8	33	0	0	0	0	394
395	TSEAX RIVER	195	671	71	244	32	118	156	601	0	0	0	0	395
396	TUYA RIVER	4	13	1	3	0	0	15	49	0	0	0	0	396
397	WEEWANIE CREEK	1	4	1	4	0	0	2	8	0	0	0	0	397
399	ZYMAGOTITZ RIVER	8	33	4	17	3	12	6	25	0	0	0	0	399
	ZIMACOR R.													
400	ZYMOETZ RIVER	1527	5465	247	851	141	544	1059	3614	1	4	14	54	400
	COPPER R.													
401	ENSHESHESE RIVER	1	4	1	4	0	0	1	4	0	0	0	0	401
402	KHUTZE RIVER	5	11	3	6	0	0	1	2	0	0	0	0	402
403	KINCOLITH RIVER	1	4	1	4	1	4	0	0	0	0	0	0	403
404	CHAMBERS CREEK	1	4	1	4	1	4	0	0	0	0	0	0	404
	AREA TOTALS:	22923	77616	3862	12628	2361	8134	14010	44957	46	136	255	753	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87 (Queen Charlotte Islands)

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
425	AIN RIVER	5	21	3	12	0	0	1	4	0	0	0	0	425
429	COPPER CREEK	169	677	31	119	21	82	182	734	0	0	0	0	429
430	DATLAMEN CREEK	6	25	2	8	0	0	15	62	0	0	0	0	430
432	DEENA CREEK	67	273	21	84	7	29	77	320	0	0	0	0	432
434	HIELLEN RIVER	33	135	6	24	2	8	23	95	0	0	0	0	434
435	HONNA RIVER	131	543	26	108	26	109	67	279	0	0	0	0	435
436	MAMIN RIVER	107	434	24	93	18	71	145	578	1	4	0	0	436
437	MATHERS CREEK	7	29	2	8	0	0	2	8	0	0	0	0	437
438	NADEN RIVER	6	28	1	5	1	5	2	9	0	0	0	0	438
439	PALLANT CREEK MORESBY L.,MOSQUITO	57	221	19	73	6	18	87	347	0	0	1	5	439
441	SANGAN RIVER	5	21	1	4	0	0	0	0	0	0	0	0	441
442	SKEDANS CREEK	20	83	2	8	1	4	12	50	0	0	0	0	442
445	TLELL RIVER	99	399	30	119	28	114	71	264	0	0	0	0	445
446	YAKOUN RIVER	991	4007	157	622	188	753	1574	6406	5	19	19	71	446
447	HAANS CREEK	5	21	2	8	0	0	12	50	0	0	0	0	447
449	LAGINS CREEK	1	4	1	4	0	0	0	0	0	0	0	0	449
450	SLATECHUCK CREEK	1	4	1	4	0	0	0	0	0	0	0	0	450
	AREA TOTALS:	1710	6925	329	1303	298	1193	2270	9206	6	23	20	76	

Appendix 5 - ANGLER DAYS AND CATCH SUCCESS - WILD AND HATCHERY, 1986-87

STR#	STREAM NAME	DAYS FISHED REP	DAYS FISHED EST	NO. ANGLERS REP	NO. ANGLERS EST	WILD KEPT REP	WILD KEPT EST	WILD RELEASED REP	WILD RELEASED EST	HATCHERY KEPT REP	HATCHERY KEPT EST	HATCHERY RELEASED REP	HATCHERY RELEASED EST	STR#
555	UNKNOWN STREAMS	303	896	115	380	41	99	91	211	2	8	9	36	555
	TOTAL FOR ALL AREAS:	71301	279849	11516	43500	3341	11554	35214	126791	3086	13223	8745	36849	

Anglers who did not report no. of days fished are not included in this report.

Appendix 8. Steelhead licencees, active and successful anglers, catch and angling effort (1966-67 to 1986-87).

Year	Licencees	Active Anglers	Successful Anglers (%)	Total Catch	Days Fished	Catch/ Successful Angler	Days Fished/ Active Angler	Catch/ Angler Day
66-67*	44,100	32,077	4,208(40.9)		N/A			
67-68	39,388	22,289	8,167(37.0)		209,435		9.4	
68-69	39,775	19,789	7,820(41.7)		189,273		9.6	
69-70	45,824	24,515	8,338(36.7)		250,680		10.2	
70-71	43,750	23,533	8,131(35.2)	53,858	232,664	6.6	9.9	0.231
71-72**	26,253	18,270	7,934(44.5)	61,428	184,978	7.7	10.1	0.332
72-73	28,992	19,489	8,165(42.7)	61,452	203,393	7.5	10.4	0.302
73-74	31,315	20,291	8,282(41.1)	58,695	208,105	7.1	10.3	0.282
74-75**	24,399	16,469	7,296(46.5)	51,652	196,751	7.1	11.9	0.263
75-76	29,594	20,265	8,770(45.8)	58,036	219,797	6.6	10.8	0.264
76-77	25,539	18,356	6,998(40.3)	40,618	186,381	5.8	10.2	0.218
77-78	25,406	17,143	7,038(43.2)	45,201	174,721	6.4	10.2	0.259
78-79	24,600	15,788	6,746(44.2)	39,448	159,363	5.8	10.1	0.265
79-80	25,095	14,755	6,384(45.0)	39,569	134,569	6.2	9.1	0.314
80-81	22,276	12,894	6,388(50.7)	50,924	131,886	8.0	10.2	0.406
81-82	21,741	12,970	6,175(48.0)	57,704	126,145	9.3	9.7	0.463
82-83**	20,856	14,475	7,686(54.3)	74,109	148,892	9.6	10.3	0.517
83-84	20,576	14,918	8,547(57.7)	98,622	173,432	11.5	11.6	0.566
84-85	23,236	17,567	10,581(61.6)	147,838	207,370	14.0	11.8	0.730
85-86	25,619	19,397	11,150(58.7)	145,416	215,313	13.0	11.1	0.682
86-87	32,721	24,371	14,560(61.3)	188,417	279,505	12.9	11.5	0.707

* Estimated on the basis of incomplete licencing data.
** Increase in steelhead licence fees.

Appendix 9. Estimated annual steelhead catch (1966-67 to 1986-87).

	Wild		Hatchery		Combined Catch		
Year	Kept	Released	Kept	Released	Kept	Released	Total
66-67					77,513	?	
67-68					48,508	?	
68-69					41,403	?	
69-70					37,092	?	
70-71					33,919	19,939	53,858
71-72					36,704	24,724	61,428
72-73					35,782	25,670	61,452
73-74					32,482	26,213	58,695
74-75					27,807	23,845	51,652
75-76					31,490	26,546	58,036
76-77					20,168	20,450	40,618
77-78					18,246	27,093	45,201
78-79					14,700	24,748	39,448
79-80					12,663	26,906	39,569
80-81					10,941	39,983	50,924
81-82	8,604	43,139	1,361	4,600	9,965	47,739	57,704
82-83	10,849	54,259	2,634	6,367	13,483	60,626	74,109
83-84	10,578	68,926	4,506	13,612	15,084	83,538	98,662
84-85	11,648	107,301	7,261	21,628	18,909	128,929	147,838
85-86	10,978	95,745	8,442	30,251	19,420	125,996	145,416
86-87	11,554	126,791	13,223	36,849	24,777	163,640	188,417

Appendix 6 - ACTIVE ANGLERS IN EACH RESIDENT AREA ACCORDING TO THE NUMBER OF STEELHEAD KEPT

RESA		CATCH CLASS 0	1 - 5	6 - 10	11 - 20	21 - 30	31 - 40	UNKNOWN	TOTAL
1	REP	586	280	68	2	0	0	0	936
	EST	2415	1154	280	8	0	0	0	3857
	%	62.6	29.9	7.3	0.2	0.0	0.0	0.0	
2	REP	1334	603	106	2	0	0	0	2045
	EST	6160	2784	489	9	0	0	0	9442
	%	65.2	29.5	5.2	0.1	0.0	0.0	0.0	
3	REP	82	53	0	0	0	0	0	135
	EST	259	167	0	0	0	0	0	426
	%	60.7	39.3	0.0	0.0	0.0	0.0	0.0	
4	REP	38	21	1	0	0	0	0	60
	EST	123	68	3	0	0	0	0	194
	%	63.3	35.0	1.7	0.0	0.0	0.0	0.0	
5	REP	101	116	2	0	0	0	0	219
	EST	351	403	7	0	0	0	0	761
	%	46.1	53.0	0.9	0.0	0.0	0.0	0.0	
6	REP	481	554	44	1	0	0	0	1080
	EST	1993	2295	182	4	0	0	0	4474
	%	44.5	51.3	4.1	0.1	0.0	0.0	0.0	
7	REP	219	185	5	0	0	0	0	409
	EST	716	605	16	0	0	0	0	1337
	%	53.5	45.2	1.2	0.0	0.0	0.0	0.0	
8	REP	81	41	0	0	0	0	0	122
	EST	268	135	0	0	0	0	0	403
	%	66.4	33.6	0.0	0.0	0.0	0.0	0.0	
9	REP	356	271	4	0	0	0	0	631
	EST	679	517	8	0	0	0	0	1204
	%	56.4	42.9	0.6	0.0	0.0	0.0	0.0	
0	REP	767	283	2	1	0	0	0	1053
	EST	1656	611	4	2	0	0	0	2273
	%	72.8	26.9	0.2	0.1	0.0	0.0	0.0	
TOTAL	REP	4045	2407	232	6	0	0	0	6690
	EST	14620	8739	989	23	0	0	0	24371
	%	60.5	36.0	3.5	0.1	0.0	0.0	0.0	

Appendix 7 - ACTIVE ANGLERS IN EACH RESIDENT AREA ACCORDING TO THE NUMBER OF DAYS FISHED

RESA		DAYS FISHED CLASS 1 - 5	6 - 10	11 - 30	31 - OV	UNKNOWN	TOTAL
1	REP	375	189	264	97	11	936
	EST	1546	779	1088	400	45	3858
	%	40.1	20.2	28.2	10.4	1.2	
2	REP	807	423	535	242	38	2045
	EST	3726	1953	2470	1117	175	9441
	%	39.5	20.7	26.2	11.8	1.9	
3	REP	73	41	17	3	1	135
	EST	230	129	54	9	3	425
	%	54.1	30.4	12.6	2.2	0.7	
4	REP	44	5	7	1	3	60
	EST	143	16	23	3	10	195
	%	73.3	8.3	11.7	1.7	5.0	
5	REP	133	51	28	4	3	219
	EST	462	177	97	14	10	760
	%	60.7	23.3	12.8	1.8	1.4	
6	REP	449	233	269	102	27	1080
	EST	1860	965	1115	423	112	4475
	%	41.6	21.6	24.9	9.4	2.5	
7	REP	293	72	35	5	4	409
	EST	958	236	114	16	13	1337
	%	71.6	17.6	8.6	1.2	1.0	
8	REP	81	27	11	0	3	122
	EST	268	89	36	0	10	403
	%	66.4	22.1	9.0	0.0	2.5	
9	REP	379	162	69	11	10	631
	EST	722	309	132	21	19	1203
	%	60.1	25.7	10.9	1.7	1.6	
0	REP	460	411	139	19	24	1053
	EST	993	887	300	41	52	2273
	%	43.7	39.0	13.2	1.8	2.3	
TOTAL	REP	3094	1614	1374	484	124	6690
	EST	10908	5540	5429	2044	449	24370
	%	46.2	24.1	20.5	7.2	1.9	

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